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A SUGGESTED BASIC-VOCABULARY IN AMERICAN HISTORY FOR THE MIDDLE GRADES

MARY G. KELTY
State Teachers College, Oshkosh, Wisconsin

MANY studies have already been made to determine the general vocabularies of children, and the special vocabularies of certain school subjects. Other studies have discovered children's difficulties in a specific subject as affected by the vocabulary of that subject.

What is greatly needed now is to ascertain *what should be the special vocabulary in a given subject*, and then to determine *which of those words or expressions can be most profitably learned at the various levels of instruction.*

To determine such a list for American History in the middle grades is the object of the following study. The difficulties are obvious, especially the lack of criteria for judging which words are fundamental to the understanding of the subject and which are not. The great need of assisting teachers in their attempts to build up a meaningful vocabulary in history prompts the publication of this list in its present form.

METHOD OF WORK

Step 1.—The identification of objectives and the formulating of principles of selection and organization of material were obvious first steps. They have been described elsewhere.[1]

Step 2.—A complete scheme of units and sub-units of subject matter was set up, since the subjects discussed would largely determine the language employed. The selection was influenced by the recent studies, particularly with regard to the desirability of including social and economic materials.[2]

Suggestions were also given as to supplying children with the life-experiences necessary to supply meanings for these terms.[3]

---

[1] Burton, W. H. *The Supervision of Elementary Subjects.* (New York: D. Appleton Co., 1929), pp. 348-357, 364-371.

[2] Kelty, Mary G. *Teaching American History in the Middle Grades of the Elementary School,* Part II. Boston: Ginn & Co., 1928.

[3] *Ibid.*

Step 3.—A tabulation was then made of words used in children's history texts for the middle grades. Words of importance to history were recorded, while the words which children encountered in their everyday living were discarded. Names of persons and places were excluded. Then for six months, student teachers marked every word in those texts whose meaning the beginning fourth-grade children found difficult. In this way the list was corrected.

Step 4.—To carry out the scheme of instruction mentioned in Step 2, it was necessary to write new stories for those subjects with which the texts used had not concerned themselves (chiefly social and industrial terms). Words from these stories were added to the original list. The combined list is represented by the figure 1 in Column I of the tabulation.

Step 5.—The writer, for a period of three years, devoted her time to preparing texts in American history for middle grades. The more recent trends in the social studies necessitated the inclusion in those stories that are comparatively new to the middle grades. Historical terms used in these stories were added to the list. They are represented by the figure 2 in Column I.

Step 6.—The resulting lists were checked against all available word studies bearing on history. These were:

1. Edward L. Thorndike. *The Teacher's Word Book.* New York: Bureau of Publications, Teachers' College. Columbia University, 1921.

In Column II, the letter T indicates the inclusion of the expression in the Thorndike list. The letters T.F. indicate that the word is among the first two thousand.

2. The Dolch-Buckingham List. *The Journal of Educational Research.* XVII (January, 1928), 11-19.

In Column III, the asterisk indicates that the word was graded fifth grade or below; the minus sign indicates that the word was graded above fifth grade.

3. Washburne's Study of Allusions in Periodical Literature. (Carleton W. Washburne. "Basic Facts Needed in History and Geography." *The Twenty-Second Yearbook of the National Society for the Study of Education,* Part II, (1923) pp. 216-233; and Shambaugh's *Free Association List.* C. G. and Olive L. Shambaugh, "A Core Vocabulary for Elementary School Pupils." *The Journal of Educational Research,* XIX (January, 1929), 39-46.

In Column IV, W indicates the words included in the Washburne list and Sh those in the Shambaugh list.

4. The Barr and Gifford list. A. S. Barr and C. W. Gifford. "The Vocabulary of American History." *The Journal of Educational Research*, XX (September, 1929), 103-121.

In Column V, the symbol B_1, indicates that the word is included in all the texts examined, B_2 indicates that the word is included in some of the texts; the minus sign indicates that the word is among the first three thousand of the Thorndike Word List and is therefore excluded from the Barr-Gifford study.

5. Stephenson's Special Vocabulary of Civics. O. W. Stephenson. "The Special Vocabulary of Civics." *The Journal of Educational Research*, XVIII (November, 1928) 297-304.

In Column VI, the symbol S_1, indicates that the word ranked 1000 or above in frequency; S_2, that the word was included in the Stephenson list.

6. Livingstone's Study of Interrelations. Ralph Livingstone. *A Study of the Interrelations between Vocabularies of Public School Subjects*, Master's thesis, Library of the Ohio State University, Columbus, Ohio, 1925.

In Column VII, Sc. means General Science; B, Biology; C, Chemistry; G, Geography; P, Physics; Ph., Physiology; A, Arithmetic; Al., Algebra; Ge., Geometry; E, English Composition; La., Latin; Fr., French; Gr., German; H, History; L, Literature; Ec., Home Economics; M, Manual Training; Ar, Art; Mu, Music.

7. The Pressey List. *The Technical Vocabularies of the Public School Subjects*, Section 5, American History, Bloomington, Illinois: Public School Publishing Co.

In Column VIII, P_1, indicates those words judged as of greater importance; P_2, those of lesser value, but important.

8. The Moser Senior High School List. K. W. Moser. *A Vocabulary Study of Textbooks in American History for the Senior High School*, 1927, Master's thesis, University of Chicago Library.

In Column IX, the symbol M_1 indicates words used 100 times or more; M_2 indicates that the word was included in the list.

9. Pressey's List for College Students. Luella C. Pressey. "The Needs of College Students in History." *The Historical Outlook*, XXI (May, 1930), 218-223.

In Column X, the letter C indicates that the word is in the Pressey list; the minus sign indicates that it is included in the first five

thousand of the Thorndike Word List and was therefore disregarded in this study.

TABULATION OF A BASIC VOCABULARY IN AMERICAN HISTORY FOR THE MIDDLE GRADES

	I	II	III	IV	V	VI	VII	VIII	IX	X
abolition	1		–		B_2				M_2	C
abroad	2	T	*						M_2	–
administration	1	T	–		B_1	S_2			M_1	C
admiral	1	T	–		B_2			P_1	M_2	–
adventure	2	T	*		B_2				M_2	–
aeroplane	1	T	*		B_2		Sc. C. G. P.		M_2	
against the law	1	TF	*		–				M_1	–
Age of Electricity	1	T	*						M_2	–
Age of Steel	1	TF	*		–				M_2	–
agreement	2	T	*					P_1	M_2	–
aground	2		–						M_2	
aide	1		–					P_2		
airplane	2	T	*	Sh				P_1	M_2	–
airship	1		*						M_2	
Alamo	1								M_2	
alliance	1	T	–		B_1	S_2		P_1	M_2	C
allies	1	T	–	W	B_1	S_2		P_1	M_2	C
all-sea route	1	T	*							–
ambush	1	T	*					P_1	M_2	
amendment	1	T	–		B_1	S_2		P_1	M_2	C
American Federation of Labor	1	T		W				P_1	M_2	
ammunition	2	T	*		B_2			P_1	M_2	
annexation	1		–		B_1	S_2		P_1	M_2	C
applying power to machinery	2	T	–							–
appoint	2	T	*		B_1	S_2			M_2	–
Arab	2	T								
Armada	1				B_2				M_2	
armistice	1		–		B_1	S_2		P_1	M_2	C
armor	2	T	*						M_2	–
army	2	TF	*		–	S_2		P_1	M_1	–
arrow	2	TF	*		–					–
Articles of Confederation	1	T				S_2		P_1	M_2	C
ashore	2	T	*						M_2	–
assassination	1		–		B_2			P_1	M_2	
assembling	1	T	*						M_2	–
assembly	2	T	*			S_2		P_1	M_2	C
asylum	1	T	*		B_2	S_2	Ph. H.	P_2	M_2	
Atlantic Cable	1	T			B_2				M_2	–
attack	1	TF	*		–			P_1	M_2	–
attempt	1	TF	*		–				M_2	–
automobile	2	TF	*	Sh	–				M_2	–
aviation	2		*						M_2	
aviator	2		*						M_2	
axe	2	TF	*	Sh	–				M_2	–
backwoods	2		–							
backwoodsman	2		–		B_2					
balance	2	TF	–		–		Ar. P. A. E. Al. Ge. F. M.		M_2	–
Baltimore and Ohio	1	T							M_2	–
banner	2	T	*						M_2	–
Barbary	1								M_2	
battle	1	TF	*		–			P_1	M_2	–
battleground	2		–						M_2	
battleship	2	T	*		B_2				M_2	
beaver	2	T	*				G. Ec.		M_2	
betray	1	T	–						M_2	–
binder	1	T	–							
black flag	1	TF	*		–				M_2	–
blockade	1		–		B_2			P_1	M_2	C
blockhouse	1		–						M_2	
bloody	2	T	*						M_2	–
Blue and the Gray," "The	1	TF			–					–
bomb	2	T	*		B_2				M_2	–
border states	1	TF	*		–				M_2	–
boundary line	1	T	*			S_2	Sc. G. Ge. H.	P_1	M_2	–
Boxer Uprising	1	T		W	B_2				M_2	

	I	II	III	IV	V	VI	VII	VIII	IX	X
brand	1	T	*					P_1		–
breeches	2	T	*						M_2	
Briand-Kellogg Peace Pact	2									
British	1	TF			–				M_1	–
buccaneer	2	T	–					P_2	M_2	
buffalo	2	T	*		B_2				M_2	
bullet	2	T	*						M_2	–
bunk	2		*							
cabin	1	T	*		B_2				M_2	–
Canadian Pacific	1								M_2	
canal	1	T	*				G. H.	P_1	M_2	–
candle	2	TF	*		–					–
cannon	2	T	*					P_1	M_2	–
canoe	2	T	*						M_2	–
capital	1	TF	*		–	S_2	H. G. A.	P_1	M_2	C
capitol	1	T	–	W		S_2		P_1	M_2	C
captain	2	TF	*		B_1				M_2	–
captive	2	T	*						M_2	–
capture	1	T	*					P_1	M_2	–
caravan	1	T	*				G. H.	P_2	M_2	
cargo	2	T	*		B_2		G. H.	P_1	M_2	–
"carpetbaggers"	1		–		B_2			P_1	M_2	
Catholics	1	T	*	W	B_2				M_2	C
Centennial Exposition	1				B_2			P_2	M_2	
Central Powers	1	TF		W	–				M_2	–
century	2	TF	*		–		G. A. H.	P_1	M_2	–
ceremony	2	T	–		B_2			P_2	M_2	–
cession	1		–					P_1	M_2	
chart	2	T	*				G. Ec. A. Mu.		M_2	–
charter	2	T	–		B_1	S_2		P_1	M_2	C
"Cheese-Box-on-a-Raft"	1	T	*							
child labor	1	TF	*		–				M_2	–
Children's Poet," "The	1	TF			–				M_2	–
Chinese Exclusion Act	1								M_2	
Christian	2	TF		W	–				M_2	–
Church of England	1	TF			–					–
circumnavigate	2		–				G. H.	P_2		
circumnavigation	1		–							
citizen	1	TF	*		–	S_1	Ph. H. L.	P_1	M_2	–
civilization	2	T	*		B_1	S_2	B. H.	P_1	M_2	C
Civil War	1	TF	*		–			P_1	M_2	–
claim	1	TF	–		–			P_2	M_2	–
clearing	1	TF	*		–				M_2	–
Clermont, The	1									
clipper ship	1		–						M_2	
closed season	1	TF	*		–				M_2	–
clothing industry	1	TF	*		–				M_2	–
coach	1	TF	*		–				M_2	–
Coal Age	1	TF	*		–				M_2	–
coast	1	TF	*		–				M_2	–
codling moth	1		–							
collective bargaining	2		–		B_2				M_2	
colonel	2	T	*							
colonial period	1	T	*	W	B_1				M_2	–
colonist	1	T	*		B_1	S_2			M_2	–
colonization	1		–		B_2				M_2	
colony	1	TF	*		B_1	S_2	Sc. B. G. H.	P_1	M_2	–
colony, a permanent	1	T	*		B_1			P_1	M_2	–
combine	2	T	–				Ge. Sc. B. A. Al.		M_2	–
commander	2	T	*		B_2			P_1	M_2	–
commerce	2	TF	*	W	–	S_2	Sc. G. H.	P_1	M_2	C
commercial	2	T	*			S_2	C. A. Ec.		M_2	C
committee	2	T	*			S_1		P_1	M_2	–
commodore	1		–		B_2				M_2	
common school	1	TF	*		–				M_2	–
communication	1	T	–		B_2	S_2	G. H.	P_1	M_2	–
company, commercial	1	T	*			S_2		P_1	M_2	–
compass	1	TF	*		–		Ar. Sc. G. P. Mu. Ge. H. M.	P_1	M_2	–
compromise	1	T	–			S_2		P_2	M_2	C
Confederacy	1	T		W	B_1			P_1	M_2	C
Confederate	2	T			B_1			P_1	M_2	C
confer knighthood	1	T	–						M_2	
Congress	2	T	*			S_1		P_1	M_1	C
conquer	1	TF	*		–				M_2	–
conquest	1	T	–					P_1	M_2	–

	I	II	III	IV	V	VI	VII	VIII	IX	X
conservation	1		–			S_2	Sc. B. C. Ec. Ph. H. G. P.	P_1	M_2	C
conspiracy	1	T	–		B_2			P_1	M_2	C
Constitution of the United States	1	T		W		S_1		P_1	M_1	C
continent	1	T	*	W			G. H.	P_1	M_2	–
Continental Congress	1	T	*	W		S_2			M_2	
control	2	TF	*		–			P_1	M_1	–
copper	2	TF	*	Sh	–		Sc. C. P. Ph.		M_2	–
copyright	1		–			S_2				
corduroy	2	T	*							
corporation	1	T	*			S_2	A. H.	P_1	M_2	C
cotton gin	1	T	*		B_2				M_2	
cotton states	1	TF	*		–				M_2	–
council	1	TF	–		–	S_2		P_1	M_2	–
county	2	T	*			S_1		P_1	M_2	–
courage	2	TF	*		–				M_2	–
court	1	TF	*		–	S_1		P_1	M_2	–
courtier	1	T	*		B_2			P_2		–
cowboy	1	T	*		B_2				M_2	
crew	2	TF	*		–				M_2	–
crime	2	T	*			S_2		P_1	M_2	–
"Crossroads of the Pacific"	1									
crusade	1	T	*	W	B_2				M_2	C
Cunard Line	1									
current	2	TF	*		–		Sc. B. C. G. P. Ph.		M_2	C
czar	2	T	–		B_2				M_2	
dam	2	T	*				Sc. G.		M_2	–
dangerous	2	TF	*	Sh	–				M_2	–
Danish West Indies	1	T							M_2	
"Dark and Bloody Ground"	1	T	*						M_2	–
debt	1	TF	*		–	S_2			M_2	–
debtor	1	T	–		B_2		A. H.	P_2	M_2	
decade	1	T	–		B_1		A. H.	P_1	M_2	C
deck	2	TF	*		–				M_2	–
Declaration of Independence	1	T	*	W	B_1	S_2		P_1	M_2	C
defeat	1	T	*					P_1	M_2	–
defend	2	T	*					P_1	M_2	–
defense	2	T	–			S_2			M_2	–
Democrat	1	T		W	B_1			P_1	M_2	C
Democratic Party	1	T		W	B_1	S_2		P_1	M_2	C
dependent	1	T	–		B_2		Sc. B. G. Al. E. La. F. Gr.		M_2	C
destroyer	2	T	*						M_2	
disadvantage	2		–		B_2				M_2	
disarmament	1		–		B_2					
discover	1	TF	*	Sh	–		G. H.	P_1	M_2	–
discoverer	1		*						M_2	
discovery	1	T	*						M_2	–
Dividing-up of China	2	T							M_2	
division of labor	2	T	*			S_2			M_2	–
draft	1	T	–			S_2	Sc. B. G. A. H. Ph. Al. Ec. M.	P_1	M_2	C
dragon	2	T	*							–
Dred Scott Decision	1								M_2	
drill	2	TF	*		–		Sc. G. P. A. Ec. M. P. Mu.		M_2	–
drum	2	TF	*		–					–
dry farming	2	TF	*		–					–
East, The	1	TF	*	W	–				M_2	–
effort	2	TF	*		–				M_2	–
elect	2	TF	*		B_2	S_2		P_1	M_2	–
election	2	T	*			S_2	G. H.		M_2	–
electricity	2	T	*	Sh					M_2	–
Emancipation Proclamation	1	T			B_1	S_2		P_1	M_2	C
emperor	1	T	*					P_1	M_2	–
empire	2	TF	*		–	S_2	G. H.	P_1	M_2	–
employee	1	T	–		B_2	S_2		P_1	M_2	C
employer	1	T	–		B_2	S_2		P_1	M_2	
enforce	2	T	–			S_2		P_2	M_2	–
enemy	2	TF	*					P_1	M_2	–
engage	2	TF	*		–				M_2	–
era	1	T	–		B_2			P_1	M_2	C
escape	2	TF	*		B_1				M_2	–
estate	1	T	*				G. A. H.	P_2	M_2	–
ether	1		–				Sc. B. C. G. P. Ph. Ec.			

	I	II	III	IV	V	VI	VII	VIII	IX	X
event	2	TF	*					P_1	M_2	–
exile	1	T	–		B_2			P_1	M_2	C
exhibition	2	T	*		P_2					
expedition	1	T	–		B_1			P_1	M_2	–
experiment	2	T	–		B_2		Sc. B. C. G. P. Ph. Ec.		M_2	–
explode	2		*						M_2	
exploration	1	T	–		B_2				M_2	–
explore	1	T	*		B_2				M_2	–
explorer	1	T	*		B_2			P_1	M_2	
export	1	T	*		B_1	S_2			M_2	C
exposition	2		–		B_2		H. L. G. E. F.	P_1	M_2	
factory system	1	T	*			S_2		P_1	M_2	–
failure	1	T	*						M_2	–
fame	2	TF	*		–				M_2	–
Far East	1	TF	*	W	–					–
federal	1	T	*	W	B_1	S_2			M_2	C
ferry	2	T	*		B_2					–
fertilizer	1	T	*				C. G.		M_2	
field servants	1	TF	*		–				M_2	–
Filipinos	2								M_2	
fireplace	2	T	*	Sh					M_2	–
fish-hatchery	1		–							
flatboat	1		–		B_2				M_2	
fled	2	T	–						M_2	–
fleet	1	TF	*		–		G. H.	P_1	M_2	–
flint	2	T	*				Sc.C.			–
follower	2	T	*						M_2	–
ford	2	T	*	Sh						–
foreigner	2	T	*			S_2			M_2	–
forest ranger	1		–							
Forks of the Ohio	1	T							M_2	–
fort	1	TF	*		–				M_2	–
"Forty-niners"	1							P_1	M_2	
found a colony	1	TF	*		–				M_1	–
Fourth of July	1	TF		W	–				M_2	–
Franklin's Plan of Union	1	T							M_2	–
free land	1	TF	*		–				M_2	–
free states	1	TF	*		–				M_2	–
freedman	1		–		B_2				M_2	
freedom of religion	1	T	*		B_2				M_2	–
frontier	1	T	*		B_1			P_1	M_2	C
fuel	1	T	*	Sh			Se. B. C. G. Ec. M.		M_2	–
fugitive slave	1	T	–		B_1			P_1	M_2	C
fur trade	1	TF	*		–				M_2	–
fur-trader	1	T	*						M_2	–
galleon	1		–							
game laws	1	TF	–		–				M_2	–
gap	2	T	*							–
gas engine	2	T	*							–
general	2	TF	*		B_1		A. Al.		M_2	–
globe	2	T	*				Se. G. H.	P_1	M_2	–
good roads	1	TF	*		–				M_2	–
government	1	TF	*		–	S_1	G. A. H.	P_1	M_1	–
government Indian school	1	TF			–				M_2	–
governor	1	TF	*		–	S_2	P. H.	P_1	M_1	–
grafting	1	T	–				Sc. B.			C
Great Compromise, The	1	T							M_2	
Great Northern Railroad	1	TF		W	–				M_2	–
"Great Peacemaker"	1								M_2	
Greek	2	T								–
Griffin, The	1									
gristmill	1		–							
growth of cities	1	T	*						M_2	–
gunboat	2		–		B_2			P_2	M_2	
gunpowder	2						Sc. C.			
harbor	2	TF	*		–				M_2	–
hardship	2	T	*		B_2			P_1	M_2	–
harrow	2	T	*							
harvester	1		*						M_2	
Hawaiian	2									
hearth	2	T	–							–
hero	2	TF	*		–				M_2	–
high seas	1	TF	*		–				M_2	–
highway	2	T	*		B_2	S_2			M_2	–

	I	II	III	IV	V	VI	VII	VIII	IX	X
history	2	TF	*		B_2				M_2	-
Homestead Act	1					S_2		P_1	M_2	
homesteader	1		—		B_2	S_2				C
homespun	2		—						M_2	
hominy	2	T	*				G. Ec.			
"Honest Abe"	1	T								
horseback	2	T	*		B_2				M_2	-
hour glass	1	TF	—		—				M_2	-
house servant	1	TF	*		—				M_2	-
house-raising	1	TF	*		—					-
hull	2	T	—				P. Ec.		M_2	
humorist	1		—						M_2	
Hundred Days' War with Spain	1	TF			—				M_2	-
hut	2	T	*						M_2	-
immigrant	1	T	*			S_2			M_2	C
immigration	1	T	*		B_2	S_2		P_1	M_2	C
implement	2	T	*		B_2		G. Ec. M. A.		M_2	-
import	1	T	*			S_2	G. A. H.	P_1	M_2	C
importance	2	T	*						M_2	-
impressment	2		—		B_2				M_2	C
improvement	2	T	*						M_2	-
inauguration	1		—		B_1			P_1	M_2	C
independence	1	T	*		B_1	S_2		P_1	M_1	C
independent	1	T	*				B. P. Al. Ge. E. La. Fr. Gr.		M_2	-
indigo	2	T	—		B_2		C. G. Ec.		M_2	
industrial	2	T	*		B_1	S_2	G. A.		M_2	
Industrial Revolution	1	T	*			S_2			M_2	
industrial school	1	T	*						M_2	
industry	2	TF	*		—	S	G. H. Ec. M.	P_1	M_2	C
inland	2		*		B_2		Sc. G.		M_2	
inn	2	T	*						M_2	-
instrument	2	T	*	Sh			Sc. P. Ph. Ge. M. Mu.		M_2	-
interchangeable parts	1		—						M_2	
interior	2	T	*	W			G. H.	P_1	M_2	-
international	2	T	*		B_1	S_2	G. H.	P_1	M_2	C
interpreter	1	T	—		B_2				M_2	
invade	2	T	—		B_2				M_2	-
invasion	2	T	—		B_1			P_1	M_2	C
invent	1	T	*						M_2	-
invention	1	T	*			S_2	Sc. G. Ar.		M_2	-
inventor	1	T	*					P_1	M_2	-
Iron Age	2	TF	*		—				M_2	-
ironclad	1		—		B_2				M_2	
irrigation	1	T	*			S_2		P_1	M_2	C
island possessions	1	TF	—		—				M_2	-
kaiser	1		—	W				P_1	M_2	
Kansas-Nebraska Bill	1	T							M_2	
king	2	TF	*						M_2	-
Ku-Klux Klan	1			W						
labor	2	TF	*	W	—	S_2		P_1	M_2	-
laborer	2	T	*		B_2				M_2	-
Lachine	2									
land office	1	TF	*		—				M_2	-
landing	2	TF	*							-
Latin America	1	T		W					M_2	-
lead plates	1	T	*						M_2	-
League of Nations	1	TF	*	W	—	S_2		P_1	M_2	-
Liberator, The	1								M_2	
Liberty Loans	1	T	*	W					M_2	
lieutenant	2	T	*		B_2			P_1	M_2	-
limitation of armaments	1		—		B_2			P_2	M_2	
liquor	2	T	*		B_2		Sc. B. C. Ec.		M_2	-
local	2	T	*			S_2	Sc. G. A.		M_2	-
location	2	T	*				Sc. G. La.		M_2	-
locomotive	1	T	*		B_2		G. H.		M_2	-
loom	1	T	—		B_2		G. Ec.		M_2	-
loyal	2	T	*		B_2	S_2			M_2	-
Lusitania	1								M_2	
machine worker	1	T	*			S_2		P_1	M_2	-
Maine," "Remember the	1	T							M_2	
mainland	1	T	*		B_2		G. H.	P_2	M_2	
making laws	1	TF	*		—	S_1			M_1	-
mankind	2	T	—						M_2	-
man-of-war	2	TF	*							

	I	II	III	IV	V	VI	VII	VIII	IX	X
manufacture	2	TF	*		–		Sc. G. A. H.	P_1	M_1	–
March through Georgia	1	T							M_2	–
market, the home	2	TF	*	Sh	–	S_2			M_2	C
markets, colonial	1	T	*			S_2			M_2	C
mass production	2	T	–						M_2	–
mast	2	T	*						M_2	–
Mayflower, The	1	T		W					M_2	
merchant marine	1	T	–		B_2	S_2		P_2	M_2	
Merrimac	1								M_2	
messenger	2	T	*						M_2	–
metal	2	TF	*		–		Sc. B. C. G. P. Ph. H. Ec. M.	P_2	M_2	–
Mexican War	2	TF	–							
microphone	2		*							
"middle passage"	1	T	–						M_2	
military	2	T	*			S_2	G. H.	P_1	M_2	–
minute-man	2	TF	–		B_2			P_1	M_2	–
mission	1	T	*		B_2		H. M.	P_2	M_2	–
missionary	2	T	*		B_2			P_1		C
mission station	1	T	*						M_2	–
Missouri Compromise	1	T							M_2	
Monitor, The	1	T							M_2	
Monroe Doctrine, The	1	T		W	B_1	S_2			M_2	C
monument	2	T	*					P_1	M_2	–
Morse Code	1	T			B_2				M_2	
motion picture	1	TF	*		–				M_2	–
movable type	1	T	*							
movement	2	T	*			S_2	H. Ar.	P_1	M_2	C
mule	2	T	*						M_2	–
mutiny	1	T	–		B_2			P_2		
national	2	TF	*		–	S_1	A. H.	P_1	M_1	–
national park	1	TF	*		–				M_2	–
native	1	TF	*		B_2	S_2	G. H.	P_1	M_2	–
natural resources	1	T	*						M_2	C
naval	1	T	*		B_1	S_2	Sc. G. A.	P_1	M_2	
navigation	2	T	*		B_1	S_2	Sc. G. P. Ge. H.	P_1	M_2	C
Navigator, The	1	T			B_2				M_2	
navy	2	T	*			S_2		P_1	M_2	–
negro	1	T	*						M_2	–
negro problem	1	T	*						M_2	–
neutral	1	T	*		B_1		C. Ph. Ar. Mu.		M_2	C
newcomer	2	T	–		B_2					
New South	1	TF	*		–				M_2	–
newspaper	2	TF	*	Sh	–			P_1	M_2	–
New World	1	TF	*	W	–				M_2	–
New York Tribune	1								M_2	
North, The	1	TF	*	W	–				M_2	–
Northerners, The	2								M_2	
Northwest Passage	1	T							M_2	–
occasion	2	TF	*		–				M_2	–
office	2	TF	*		–	S_1		P_1	M_2	–
official	2	T	–			S_2		P_1	M_2	C
officer	2	TF	*		–	S_2		P_1	M_2	–
Ohio Company	1	T							M_2	–
"Old Hickory"	1	T							M_2	
Old World	1	TF	*	W	–				M_2	–
"open door"	1	TF	*		–	S_2			M_2	–
opening the ports	1	TF	*		–				M_2	–
orator	1	T	–		B_2				M_2	
Oregon Trail	1	T							M_2	
organise	2	T	*		B_1	S_2			M_2	–
otter	2		*				B. G.		M_2	
outlying settlements	1	T	*						M_2	
overboard	2	T	*							
overland route	1	T	–		B_2				M_2	
overland stage	1	T	–						M_2	
overseer	1	T	–		B_2				M_2	
pack horse	1	TF	*		–				M_2	–
paddle	2	T	*	Sh					M_2	–
Panama Canal	1	T		W					M_2	–
Parliament	2	T	–	W	B_1	S_2		P_1	M_2	C
passage	2	T	*				Sc. G. Ph. L.		M_2	–
patent	1	T	*			S_2	B. H.	P_2	M_2	–
Patent Office	1	T							M_2	–
patroon	1		–					P_2		

	I	II	III	IV	V	VI	VII	VIII	IX	X
peaceable	2	T	—						M_2	
peace conference	1	T	*	W				P_1	M_2	–
peaceful	2	T	*						M_2	–
pence	2	T	*		B_2				M_2	
Pequot	2								M_2	
periscope	2		—				B. P.			
permanent	2	T	*				L. Sc. B. C. G. P. Ph. H.	P_1	M_2	–
persecution	1	T	—		B_2				M_2	C
Philippines, Independence of the	1	T							M_2	
phonograph	1		*	Sh			Sc. P.			
photography	1		*				C. P.			
pilgrim	1	T	*	W	B_2			P_1	M_2	–
pillory	1		—					P_2		
pioneer	1	T	*		B_1		Sc. G. H.	P_1	M_2	C
pipe of peace	1	TF	*		—				M_2	–
piracy	1		—						M_2	
pirate	1	T	*		B_2			P_1	M_2	–
pistol	2	T	*							–
plane	2	T	*				P. G. M. Ar.			–
Plant Wizard," "The	1	T								–
plantation	1	T	*		B_1		G. H.	P_1	M_2	
plantation system	1	T	*						M_2	C
plot	1	T	*				Al. H. L.	P_1	M_2	–
polar exploration	1	T	—							
policy	2	T	*			S_2	A. H.	P_1	M_2	C
political party	2	T	*		B_1	S_2		P_1	M_2	C
pony express, the	1	T	*							–
Poor Richard's Almanac	1	T								
poor whites	1	TF	*		—				M_2	–
population	2	T	*			S_2	G. A. H.	P_1	M_1	–
port	2	TF	*		—				M_2	–
portage	1		—		B_2		G. H.	P_2	M_2	
position	2	T	*				Ar. G. A. Ge. Gr.		M_2	–
Post Office Department	1	T				S_2			M_2	–
postrider	1		—						M_2	
powder	2	T	*							–
power	1	TF	*		—		Sc. G. P. A. Al.		M_1	C
powerful	2	T	*						M_2	–
power loom	1	T	—						M_2	–
prairie schooner	1		—		B_2				M_2	
president	1	TF	*	W	—	S_1		P_1	M_1	–
press, the	1	TF	*	Sh	—				M_2	–
printer	2	T	*						M_2	–
prison	1	TF	*		—	S_2			M_2	–
privateer	2		—		B_2			P_2	M_2	
product	1	TF	*		—		C. G. P. A. Al.		M_2	–
production	2	T	—		B_2		B. G.		M_2	–
progress	2	T	*			S_2		P_1	M_2	–
Progressive Party	1	T		W	B_1			P_1	M_2	
prohibition	1	T	*	W	B_2	S_2	Sc. B. H.	P_1	M_2	
proprietor	1	T	—		B_1		G. H.	P_1	M_2	
prospector	1		—				G. H.	P_2	M_2	
protection	2	T	*			S_2	G. H.	P_1	M_2	–
protectorate	1		—		B_2			P_1	M_2	
Protestant	2	T		W	B_2			P_1	M_2	C
public school	2	TF	*		—	S_1			M_2	–
punishment	2	T	*		B_2				M_2	–
purchase	1	TF	*		—		A. H.	P_1	M_2	–
quantity production	1	T	—						M_2	–
radio	2	T	*	Sh					M_2	
raft	2	T	*							
raid	2	T	*		B_2			P_1	M_2	
railroad	2	TF	*		—		Sc. G. H.	P_1	M_2	–
railway	2	T	*			S_2			M_2	–
railway mail car	2	T	*						M_2	–
ransom	2	T	*						M_2	–
raw material	2	TF	*							–
reaper	1	T	*		B_2				M_2	
rebel	2	T	—					P_1	M_2	–
rebellion	2	T	—		B_2			P_1	M_2	C
recent	2	T	*		B_2				M_2	–
recognize	2	T	—		B_2				M_2	–
reconstruction	1		—		B_1			P_1	M_2	C
Red Cross	1	TF		W	—				M_2	–
reduction of armament	2		—					P_2	M_2	C

	I	II	III	IV	V	VI	VII	VIII	IX	X
refuge	2	T	–						M_2	–
regiment	1	T	*		B_2			P_1	M_2	
religion	2	T	*					P_1	M_2	–
religious	2	T	*						M_2	–
representative	1	T	*	W		S_2		P_1	M_2	C
republic	2	T	*			S_2	G. H.	P_1	M_2	C
Republican Party	1	T	*	W	B_1	S_2		P_1	M_1	C
rescue	2	T	*						M_2	–
reservation	1	T	–		B_2		G. H.	P_1	M_2	
result	2	TF	*		–		A. Al.		M_2	–
retreat	1	T	*					P_1	M_2	–
revolt	2	T	–		B_2			P_1	M_2	–
revolution	1	T	*	W	B_1	S_2	G. Ge. H.	P_1	M_2	C
rifle	2	T	*						M_2	–
risk	2	T	*						M_2	–
rodeo	1		–							
roller mills	1	T	*							–
rotation of crops	1		–		B_2				M_2	
Rough Riders	1	T							M_2	–
round-up	1	TF	–		–				M_2	–
route	1	T	*				G. H.	P_1	M_2	–
royal	2	TF	*		–			P_1	M_2	–
rum	2	T	–		B_2				M_2	
sack (of a city)	1	TF	–	Sh	–					–
sailing charts	1	T	*						M_2	–
Santa Fe Trail	1	T							M_2	
savage	2	TF	*		–		Sc. G. H.	P_2	M_2	–
scalp	2	T	*						M_2	–
science	2	T	*				Sc. B. C. G. P. Ph. Ec.		M_2	–
scientist	2		*		B_2				M_2	
score (of years)	1	TF	–		–		A. Mu.		M_2	–
scout	1	T	–						M_2	–
sculptor	1	T	–							
sculpture	1	T	*						M_2	
Sea of Darkness	1	TF			–				M_2	–
seaplane	2		*							
secession	1		–		B_1			P_1	M_2	C
secretary	2	T	*			S_2			M_2	C
section	2	TF	*		–	S_2			M_2	–
Senate	2	T	*	W		S_2		P_1	M_2	C
senator	2	T	*		B_1	S_2		P_1	M_2	–
settle	1	TF	*		B_2				M_2	–
settler	2	T	*		B_2					–
settlement	1	T	*			S_2	G. H.	P_1	M_2	–
"Seward's Ice Box"	1									
sheep-herder	1		–							
shield	2	T	*						M_2	–
shuttle	2	T	–				Sc. P. Ec.			
sickle	2	T	*							
siege	1	T	–		B_2			P_1	M_2	C
signal	2	T	*						M_2	–
Sioux	2			W						
slave	1	TF	*		–			P_1	M_2	C
slave quarters	1	TF	*		–					–
slave states	1	TF	*		–				M_2	–
slave trade	1	TF	*		–				M_2	–
slavery	1	T	–		B_1			P_1	M_1	C
sleigh	2	T	*							–
smelting	1	T	*				Sc. C. G. Ec.			
smuggle	2		*		B_2				M_2	C
social	2	T	–			S_2			M_2	–
society	2	TF	*		–	S_2			M_2	–
soldier	2	TF	*		–			P_1	M_2	–
South, The	1	TF	*	W	–				M_1	–
Southerners, The	2								M_2	
Spanish America	1	TF			–					–
Spanish-American War	1	TF		W	–				M_2	–
Spanish Main, The	1	TF			–				M_2	–
spear	2	T	*							–
spin	1	T	*	Sh			G. Ec.		M_2	–
spindle	1	T	–		B_2		B. P. Ec.		M_2	–
spinning jenny	1		–							
spinning wheel	2	T	*		B_2					–
spun	2	T	*						M_2	–
spy	2	TF	*		–			P_1	M_2	–

	I	II	III	IV	V	VI	VII	VIII	IX	X
stagecoach	1	T	*		B_2				M_2	–
standard parts	1	TF			–				M_2	–
Star Spangled Banner, The	2	T								–
state	1	TF	*		–	S_1	G. H.	P_1	M_1	–
statement	2	T	*				E. La. F. Gr. L.		M_2	–
state park	1	TF	*		–				M_2	–
statesman	2	T	–			S_2		P_1	M_2	–
steamboat	2	T	*		B_2				M_2	
steel	1	TF	*	Sh	–		C. G. M.		M_2	–
Steel Age, The	2	TF	*		–				M_2	–
stockade	1		*		B_2			P_2	M_2	
steamship	2	T	*		B_2				M_2	
stocks	1	TF	–	Sh	–	S_2			M_2	C
stockyards	2		*							
storehouse	2	T	–						M_2	
strike	1	TF	*	Sh	–	S_2		P_1	M_2	C
stump	2	T	*						M_2	–
submarine	1		*		B_1		Sc. G. P. H.	P_1	M_2	
Submarine War Zone	1									
surplus	1	T	–		B_2		Sc. C. B. G. P. Ph. H. Ec.		M_2	
surrender	1	T	*		B_1			P_1	M_2	C
surround	2	T	*						M_2	–
surveyor	1	T	–		B_2			P_1	M_2	
"Swamp Fox"	1	T	*						M_2	–
sword	2	TF	*		–				M_2	–
tank	1	T	*	Sh						–
tax	1	TF	*	Sh	–	S_2	G. A. H.	P_1	M_2	–
telegraph	1	T	*		B_1		Sc. G. P. H.	P_1	M_2	–
telephone	1	T	*	Sh			Sc. G. P.		M_2	–
temperance	1	T	–		B_2				M_2	–
temple	2	TF	*		–					–
territory	1	T	*			S_2	G. H.	P_1	M_1	C
Texan	2								M_2	
textile	1	T	–		B_2		Sc. C. G. H. Ec. Ar.		M_2	
thresh	2	T	*				G. H.			–
throne	2	TF	*		–			P_2	M_2	–
tobacco	2	T	*	Sh			Sc. B. G. Ph.		M_2	–
tomahawk	2	T	*					P_1		
torpedo	2	T	*		B_2			P_2	M_2	
Tory	1	T		W	B_2				M_2	
town-meeting	1	TF	*		–	S_2			M_2	–
townspeople	2	TF	–		–					–
tractor	1		*				G. P.			
trade route	1	T	*						M_2	–
trade-mark	1	TF	*		–					–
trading post	1	TF	*		–				M_2	–
trail	2	T	*				G. H.	P_1	M_2	–
traitor	1	T	*		B_2			P_1	M_2	–
transcontinental	1		–		B_2				M_2	
transportation	1	T	*		B_1	S_2	Sc. G. A. H.	P_1	M_2	–
treasure fleet	1	TF	*		–				M_2	–
treasurer	1	T	*		B_2	S_2			M_2	
treasury	2	T	*	W	B_1	S_2		P_1	M_2	–
treaty	1	T	*		B_1	S_2		P_1	M_2	C
treaty of peace	1	T	*			S_2			M_2	–
trench	2	T	*					P_1	M_2	–
tribute	2	T	–		B_2				M_2	–
trinket	1		*						M_2	
trolley car	1	T	*				G. P.		M_2	–
troops	2	TF	*		–			P_1	M_2	–
trundle bed	2	T	–							
tunnel	2	T	*							–
turnpike	1	T	–		B_2				M_2	
twine, binder	1	T	–							
typewriter	1	T	*						M_2	–
Uncle Sam	1	T		W						
Uncle Tom's Cabin	1	T								–
unconditional	2		–						M_2	
underground railroad	1	T	*		B_2				M_2	–
undertaking	2	T	–						M_2	–
uniform	2	T	*				C. P. Al. Ec. Ar. Mu.		M_2	–
Union, The	1	TF	*	W	–	S_2		P_1	M_2	C
Union Pacific Railroad	1	T		W					M_2	–

	I	II	III	IV	V	VI	VII	VIII	IX	X
unite	1	TF	*		–		Sc. C. Al.		M_2	–
United States Steel Corporation	1	T							M_2	–
uprising	2	T	–		B_2			P_1	M_2	
Versailles, Treaty of	1			W		S_2			M_2	
venture	2	T	–					P_1		–
victor	2	T	*						M_2	–
Victoria, The	2									
victory	2	TF	*		–			P_1	M_2	–
Virginian	2	T								–
vote	2	TF	*		–	S_1	A. H.	P_1	M_1	–
voter	1	T	*			S_2		P_1	M_2	–
voyage	1	T	*				G. H.	P_1	M_2	–
vulcanization	1		–							
wages	1	TF	*		–				M_2	–
waistcoat	2	T	–							
wampum	2	T	*					P_1		
war	2	TF	*	Sh		S_1		P_1	M_1	–
War of 1812	1	TF		W	–			P_1		–
war whoop	1	T	*							
warn	2	TF	*		–				M_2	–
warrior	2	T	*					P_1	M_2	–
warship	2	T	–		B_2				M_2	
Washington Conference	1	T				S_2			M_2	–
"watchful waiting"	1	T	–						M_2	–
water power	2	TF	*		B_2					–
water route	1	T	*						M_2	–
waterways	2		–		B_2	S_2	Sc. G. H.	P_1	M_2	
weapon	2	T	*				G. H.	P_1	M_2	–
weave	1	T	*		B_2				M_2	
West, The	1	TF	*	W	–				M_2	–
western front	1	TF	*		–				M_2	–
whale	2	T	*							
wharf	1	T	*		B_2		Sc. G.			
White House	1	TF		W	–				M_2	–
"White Ribbon"	1	TF	*		–					–
White Star Line	1	TF			–				M_2	–
wig	2	T	*							–
wigwam	2	T	*						M_2	–
wilderness	2	T	*						M_2	–
wireless telegraph	2	T	*						M_2	
wireless telephone	2	T	*						M_2	
witch	2	T	*							–
"Wizard of Menlo Park"	1									
woman suffrage	1	T	–	W		S_2			M_2	C
woodranger	1		–							
World War	1	TF		W	–				M_2	–
World's Fair	1	TF			–					–
worship	2	T	*					P_1	M_2	–
wreck	2	T	*	Sh					M_2	–
X-ray	2		–				Sc. C. P. Ph.			
Yale	2			W					M_2	
Yankee	1			W					M_2	
Yankee Doodle	1									
Zeppelin	2							P_2		

COMPARISON OF THE LISTS

Various estimates have been given of the vocabulary of the "average" pupil. Cuff[4] has summarized these studies, showing that for fourth grade, the estimates run from 5,220 to 10,886; for the fifth grade, from 6,030 to 21,648; and for the sixth grade from 4,192 to 26,520. Of even the smallest of these estimates the "basic-vocabulary in history" constitutes but a small part. The tabulation as given above includes 711 words or terms. Of this number 591, or 83 percent, are included in the

[4] Cuff, Noel B. "Vocabulary Tests." *Journal of Educational Psychology*, XXI (March, 1930), pp. 212-220.

Thorndike list. Those not included in the Thorndike list are largely proper names, or words occurring in recent history, especially those connected with industry: airship, peace pact, conservation, collective bargaining, etc.

Of the 711 words in the list, 604 are included in the Dolch-Buckingham list, practically all those excluded being proper names. Of those words common to both lists, 70 percent are graded by Dolch and Buckingham as being at the fifth grade level or below.

No comparisons are made with the Washburne and Shambaugh lists because they represent special types of investigations, not bearing closely on the basic vocabulary of history.

The Barr and Gifford list consists of 1,900 words, of which 193 are included in this list. This is 22 percent of the 711 words. The small percentage is due to the fact that the Barr and Gifford study excluded the first three thousand of the Thorndike list—which constitute a large part of Kelty's list.

The similarity between the vocabularies of civics and history is indicated by the fact that, out of the 728 words in the Stephenson study, 132 are included in the tabulation above, or 19 percent. A comparison with upper-grade history would doubtless show a higher degree of correlation.

The Pressey list contains 1,084 words, of which 226 are included in the above tabulation, or 20 percent. The large number of words in the Pressey list which are not contained in Kelty's tabulation, shows that no attempt is being made in the study herewith reported, to teach to middle-grade children the entire vocabulary of history. The words in the Pressey study which are not contained in the above tabulation are very largely those taken from political history. On the other hand, those in this tabulation but not in the Pressey list, consist of proper names, words from industrial history or recent history, and many which the teachers who ranked the Pressey study did not list as "difficult;" such as, adventure, against the law, arrow, attempt, etc.

The Moser list contains 8,365 words, of which 583 are included in the tabulation. Eighty-two percent of the words of Kelty's list therefore, are included in the Moser list. But the 7,782 words of the Moser study which are not included in the tabulation show again that Kelty's list does not attempt to burden middle-grade children with the entire historical vocabulary. On the other hand, the large percentage of Kelty's words included in Moser's list is probably accounted for by the fact that Moser

made an actual count of words used by various authors rather than only those which teachers considered difficult.

THE USE TO BE MADE OF THE "BASIC VOCABULARY" LIST

The purpose of assembling such a list as this tabulation presents is to assist teachers both in the teaching and in the testing of vocabulary. All the terms should be mastered; a sampling will not suffice. The list should be broken up into manageable groups of perhaps four or five (the exact number has not yet been experimentally determined) words or expressions which bear on the topic included in a sub-unit.[5] The teacher makes special provision for teaching the meaning of these terms, and afterwards includes them in drill exercises. At the end of each unit, these "minimal essential terms" are gathered together, and the children are tested as to their understanding of the meanings.

Mrs. Pressey suggests that high-school children be given copies of her complete list for self-testing purposes. For middle-grade children a better procedure, perhaps, is for each pupil to set aside one section of his notebook in which to record only those words which he missed on the tests, together with a very simple statement of their meaning and examples of their uses in sentences.

A very desirable experiment that teachers might perform in the course of using this list is the classification of the words of expressions into three groups: (1) words whose meaning can be grasped from the context (2) those whose meanings can be grasped with the aid of only a few explanatory sentences and (3) those for which a definite background in experience must be built up. Identifying those words or expressions which can be apprehended only by an actual experience, would give very valuable help in teaching procedures.

[5] Kelty, Mary G. *Op. cit.*, Part II, any sub-unit.

PRINTING VERSUS CURSIVE WRITING IN BEGINNING READING INSTRUCTION

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INTRODUCTION

THIS experiment undertakes to test the relative reading efficiencies of two groups of pupils in the 1A grade who were taught during the first eight weeks by means of cursive writing and print, respectively.[1] The problem of the relative values of the two modes of instruction has been before educators for some time, and within recent years there have been changes from one to the other. Prior to this experiment, however, so far as we have been able to learn, no one has subjected the problem to experimentation. In the literature on reading, one finds widely varying opinions based upon theory or general observation. Practical considerations brought the problem to the attention of the authors and it occurred to them that here was a good opportunity to take it out of the realm of opinion and subject it to controlled observation. Accordingly, the following experiment was planned and carried out.

THE EXPERIMENT

I. *The Testing*

We have used two forms of the Detroit Word Recognition Test and Examination A of the Dearborn Tests of Intelligence. All the children were rated for intelligence by the Dearborn test early in the semester. One form of the Detroit Word Recognition Test was administered during the second week of November. Another form of this test was administered during the last week of January.

In order to get some indication of the validity of the Detroit test in this particular setting, the teachers taking part in the experiment were asked to submit a list of words which they had taught during the first eight weeks' instruction. This list was compared with the 62 words which make up the Detroit Word Recognition Test, with results as follows: The total number of different words occurring in the Detroit Word Recognition Test that had been taught by the teachers was 58. The range in the number of words taught by individual teachers was 9-58. The mean number was 37.

[1] Our sincere thanks are due the officers and teachers who made this experiment possible.

II. Selection of Experimental and Control Groups

A. TEACHERS

In order to secure comparable results, it seemed necessary to select two groups of teachers who, according to the best available criterion, were of approximately equal efficiencies, as well as two groups of pupils equated in test-intelligence. We proceeded by first selecting 14 teachers who, in the judgment of the supervising officers, were representative. The efficiency ratings for three years were taken as a criterion.

For eight weeks no teacher control group was selected. All teachers, except the experimental group, were teaching by means of cursive writing. At the end of the eight weeks, the Detroit Word Recognition Test, Form A, was given to the pupils taught by the 14 experimental teachers and to the pupils taught by 38 cursive teachers selected at random.[2] A control group of 14 teachers was selected from this latter group.

B. PUPILS

All the pupils of the 1A grade in Divisions 10-13 were tested during the first semester by means of the Dearborn Intelligence Test, Examination A. We selected control and experimental pupil-groups numbering approximately 500 each. Our final results were taken from 485 pupils in the print group and 463 in the cursive group. The control and experimental groups had average I.Q.'s of 94 and 95, and mean mental ages of 6-3 and 6-4 respectively. The standard deviations in test scores were 13.96 and 13.18 respectively.

RESULTS AND DISCUSSION

I. Teacher Efficiency in Printing

One of the objections which have been leveled at the use of printing in the 1A grade is that teachers lack speed. It seemed well, therefore, to adapt some phase of the experiment to testing speed efficiencies at different practice levels.

None of the teachers had had material experience in teaching pupils by means of printing. Speed tests were arranged for each of the fourteen experimental teachers. One of these tests came prior to the beginning of instruction in the fall, September 16; a second on November 29; and a third on January 27. Records of these tests have been carefully kept.

[2] For brevity we shall speak of cursive teachers and cursive group, meaning teachers who began teaching reading by using cursive writing, and pupils who were taught by using cursive writing.

In the first speed test, the teachers, without any knowledge of what was to take place, were asked to write repeatedly in longhand, "The quick brown fox jumped over the lazy dog." They wrote during a period of two minutes. The usual technique for controlling work periods was employed. In a similar way, they were then tested in printing. The print score over the cursive score gives the percentage efficiency. The following are the results:

Ratio of print to cursive speed:

September 16, 1927	63
November 29, 1927	87
January 27, 1928	97

The final test shows that five teachers had acquired a speed in printing which exceeded their speed in cursive writing.

II. *Pupil Reading Ability*

A. AT THE BEGINNING OF THE EXPERIMENT

The pupils in this experiment, in the main, come from areas of retarded culture into which the more obvious cultural advantages of a city like Washington do not penetrate very far.[3] Judged by results from the Detroit Test in other connections, about 95 percent of them entered school unable to read at all. This fact is an added control for the experiment, for we may proceed with the assurance that our testing reveals results which are essentially the product of school situations.

How far the ability of the control pupils to read print, at the middle of November, can be attributed to informal school environment or to teaching by means of cursive writing, we are unable to say. The problem of transfer from reading cursive writing to reading print opens up a rather enticing field of speculation, but we have but little definite evidence to offer in connection with it. At any rate, since the control teachers did not use printing up to the middle of November, we are able to get an objective check upon the reading ability of the control children at that time and to speak with some assurance of the results—from whatever cause.

B. AFTER EIGHT WEEKS OF INSTRUCTION

The results of the Detroit Word Recognition Test, Form A, at the end of eight weeks for both the experimental and the control groups are given in Table I, column 2. The difference between the reading averages is 1.03 in favor of the print group, with a probable error of .13. The

[3] The children in this experiment are colored.

$\frac{D}{PE_d}$ is 8.0. A difference of this sort is considered reliable when it is four times its probable error.

c. AT THE END OF THE SEMESTER

The checking of reading results at the end of the experiment, the last week in January, was made by means of the Detroit Word Recognition Test, Form B. Table I, column 2, gives these results. The average for the experimental group on the Detroit Word Recognition Test, Form B, is 10.66; for the control group, 7.08; a difference of 3.58. The probable error of the difference is ± .357. The $\frac{D}{PE_d}$ is 10.0.

FURTHER COMPARISONS

Comparison by Excluding Zero Scores

The presentation thus far has dealt with average scores based upon all the pupils who took the test. Scrutiny of the data, however, revealed that in November 163 pupils of the print group and 206 of the cursive group made zero scores on the Detroit Word Recognition Test. The corresponding percentage for the print group is 33.8; for the cursive group, 44.6. In January the percentage for the print group is 9.7, and for the cursive group, 15.7.

TABLE I

SUMMARY OF READING TEST RESULTS BY GROUPS FOR NOVEMBER AND JANUARY AND CERTAIN CONSTANTS DERIVED THEREFROM

DETROIT TEST Column	1 No.	2 M	3 —	4 CV
CURSIVE				
Zeros Included				
November	462	3.14	2.185	69.58
January	427	7.08	6.890	97.32
Zeros Excluded				
November	256	3.65	2.810	76.98
January	360	7.93	7.200	90.79
PRINT				
Zeros Included				
November	482	4.17	3.400	81.53
January	443	10.66	8.630	80.96
Zeros Excluded				
November	276	5.415	4.080	75.41
January	400	11.535	8.630	74.78

Relative Variability

Table I also gives the percentage variability measures (column 4) for the print and cursive groups in November and January respectively. For the control group they are in November, 69.58; in January, 97.32. The same constants with the zeros eliminated are for the respective dates 76.98 and 90.79. For the experimental group these constants are 81.53

and 80.96. With the zeros eliminated they are 75.41 and 74.78, the differences being insignificant. The difference in the control group without eliminating zeros is 27.74 ± 4.87. $\frac{D}{PE_d}$ equals 5.70. The difference with the zeros excluded is 13.81 ± 5.85. The $\frac{D}{PE_d}$ is 2.36. We must conclude from this that the cursive pupils become more variable or unlike. When the zeros are eliminated there is still a very strong tendency in the same direction. The results in the two groups contrast. The print group becomes variable in proportion to the size of the scores, i.e., the coefficient of variation tends toward constancy. Thus the relative variability in the print group in reading conforms to the general tendency in intelligence scores.

The behavior of the coefficient of variability in the control group makes reasonable the inference that instruction by cursive writing is not only relatively ineffective while actually operating, but in addition leaves in its trail certain difficulties, probably of an adjustment sort, which impede the progress of the pupils.

Percentage Distributions

For the purpose of casting our results into another very obvious form, we have determined for each group the percentages of pupils making scores of 0, 1-5, 6-10, 11-15, 16-20, and above 20. Table II gives the distributions of the cursive and print groups from the November and January results. Here we have an interesting picture of what takes place as the result of the two procedures. It will be noted that the distributions in November bear rather marked similarities, whereas in January they tend to be just the reverse of each other, with the advantage in the direction of the print procedure.

GENERAL CONCLUSIONS

(1) Whereas initial speed in printing, in the case of transfer of teachers practiced in cursive writing, is considerably less, in the course of eight weeks teachers practically overcome their handicap. This statement is made because it is probable that a speed efficiency of 87 is sufficient for the ordinary needs of the classroom, for the cursive test by these teachers involved writing at probably top speed such as they would not use in a sustained way in ordinary instruction.

(2) If our experimental teachers are representative, the problem of speed should figure very much less in the transfer of instruction from cursive writing to printing than may appear from superficial observation.

(3) Teaching by the cursive procedure is definitely less effective for reading print than the print procedure. Print pupils score higher than cursive pupils both after eight weeks' instruction and at the end of the semester. This superiority is evident from every comparison we have made.

(4) There is some evidence that the cursive procedure creates unnecessary difficulties for the pupils for some time after they have begun reading print.

TABLE II

FURTHER COMPARISONS BY PERCENTAGES OF THE GROUPS ACHIEVING GIVEN SCORES

DETROIT WORD RECOGNITION TEST

	Form A, November, 1927		Form B, January, 1928	
	Cursive	Print	Cursive	Print
Score				
0	44.58	33.81	15.70	9.7
1-5	46.97	46.68	44.50	30.47
6-10	5.84	13.07	30.84	20.77
11-15	1.73	4.98	7.26	14.46
16-20	.43	1.45	6.79	11.74
21 and above	.43	...	4.92	12.87

COSTS AND OFFERINGS OF CALIFORNIA HIGH SCHOOLS IN RELATION TO SIZE

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THE present investigation is concerned with a limited phase of school efficiency and is an attempt to answer the question: At what size may California high schools function at the lowest cost and at the same time provide educational opportunities that are in agreement with current theory of secondary education?

The study is limited to the four-year high schools of the state of California with enrollments ranging up to 1400. The size of school is considered primarily with respect to cost and maintenance and range of offerings. Many other factors, of course, enter into the optimum sized high school; physical equipment, training, and experience of the teaching staff, degree of specialization of instruction, pupil classification on basis of ability, etc. All these factors, however, are closely associated with the two main lines of investigation, the influence of size upon:

1. The cost per pupil
   (a) for teachers' salaries
   (b) for current expenses.
2. (a) the number of curricular activities offered, both of the conventional and non-conventional type
   (b) the number of extra-curricular activities.

Teachers' salaries were taken as an index of cost because they fluctuate less from year to year than any other single item of cost. The data on teachers' salaries include all money spent for principals' and teachers' salaries. The cost per pupil for both teachers' salaries and total current expenses was obtained by dividing the total amount paid out in each case by the number representing average daily attendance.

The data were obtained from the official state and county school reports on file in the state department of education at Sacramento; from a questionnaire sent to principals of high schools throughout the state; and from road, irrigation, and federal geological survey maps.

The method of procedure is largely the determination of causal relationship by statistical procedure. In part, it is comparative and descriptive.

Of the 309 four-year high schools in the state of California 102, or 33 percent, had an enrollment of less than 100 pupils. One hundred seventy-six, or 56 percent, had an enrollment of less than 200 pupils. The number of smaller schools is apparently excessively large with respect to the number of pupils attending them. This situation is in direct contrast with the situation throughout the United States where the largest percentage of high-school enrollment is being educated in the smaller schools.

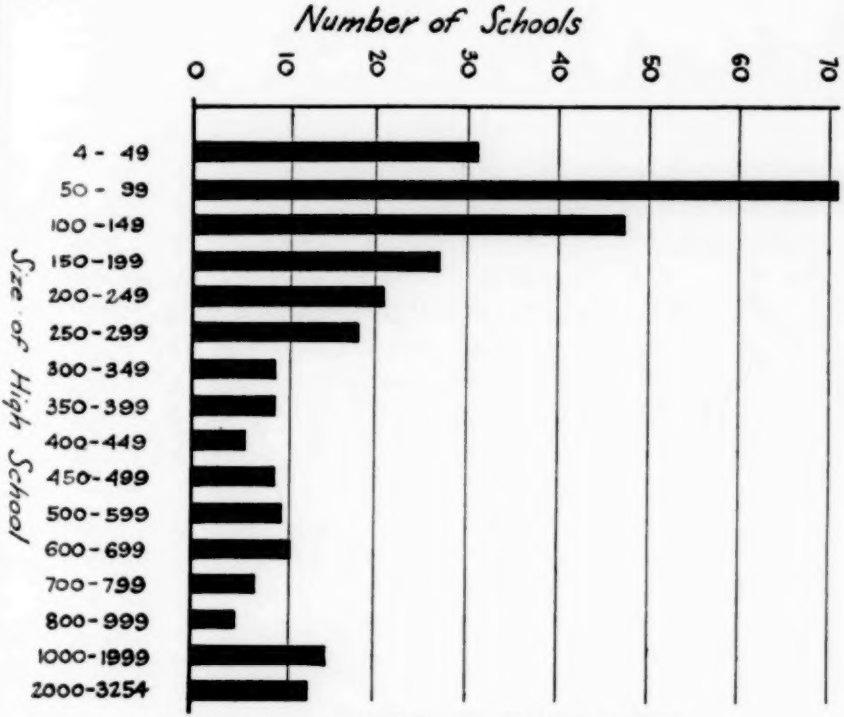


FIGURE 1.—NUMBER OF SCHOOLS IN RELATION TO SIZE

STATISTICAL PROCEDURE

In the determination of the relationship between cost of California high schools and size, correlations were computed between different sized groups of high schools in order to determine to what extent the distribution is rectilinear, first with cost per pupil for teachers' salaries and second with the cost per pupil for total current expenses. The coefficient of correlation and correlation ratio were computed for each divi-

sion of costs for the schools ranging from the smallest to 1400 in enrollment. In each division of costs the coefficient of correlation was also computed for schools from 500 to 1400 in enrollment. Table I shows the relationship between the cost per pupil for teachers' salaries and the different sized groups of high schools, and Table II shows the correlations obtained between size and total current expenses.

TABLE I

Enrollment	N	x	y	Pearson
0-100	85	64.02	69.18	−.47 ± .056
100-200	75	29.89	34.55	−.01 ± .077
200-300	35	27.18	44.59	−.12 ± .112
300-400	24	32.08	27.07	.001 ± .138
400-500	21	54.5	35.95	.238 ± .093
600-1000	14	91.74	20.78	.017 ± .180
1000-	21	915.8	26.46	.121 ± .125

x is the deviation from the mean for size of school and
y is the deviation from the mean for the cost.

TABLE II

Enrollment	N	x	y	Pearson
0-100	84	21.84	97.23	−.401 ± .123
100-200	75	29.89	73.7	−.003 ± .077
200-300	35	27.18	59.39	.091 ± .113
300-400	24	32.08	38.21	.142 ± .010
400-600	21	54.5	81.05	.161 ± .010
600-1000	14	91.74	27.17	.235 ± .080
1000-	21	915.8	41.56	.011 ± .146

x is the deviation from the mean for size of schools and
y is the deviation from the mean for the cost.
The correlations obtained show that the smallest schools are the most expensive. The negative correlations show that as the schools grow larger in the group of smaller attendance the cost per pupil becomes less.

By taking all the schools of the state in one group and correlating size with cost for teachers' salaries, the correlation obtained by the product moment formula is negative; $r = -.298 \pm .046$.

From the correlation Table II it is evident that cost per pupil does not increase in a linear manner as size of schools increases. Since the data appear to be curvilinear in their distribution, it is necessary to use a new constant, namely, the correlation ratio, etc., conventionally denoted by the Greek letter η.

The method of procedure in calculating eta is that reported in Rugg.[1] The formula is:

$$\eta = \frac{\Sigma}{\sigma y} = \frac{\sqrt{\frac{s\,[\eta_x\,(\bar{y}_x - \bar{y})^2]}{N}}}{\sigma y}$$

[1] Rugg, Harold O. *Application of Statistical Methods to Education*, New York: Houghton Mifflin Co., 1917.

and may be used as a measure of the degree of correlation existing in a particular case quite regardless of whether the regression is linear or not. When the regression is strictly linear, eta will be equal to r. By calculating eta between the size and cost per pupil for teachers' salaries we have $-.47 \pm .032$. To determine whether eta is significantly different from r it was necessary to resort to methods developed by Blakeman[2] for testing the significance of the difference between eta and r. For this check we apply Blakeman's formula,

$$\frac{\sqrt{\eta}}{.67499} \cdot \frac{1}{2}\sqrt{\eta^2 - r^2}$$

and by substituting values

$$\frac{267}{.67499} \cdot \frac{1}{2}\sqrt{(.47)^2 - (.298)^2} = 4.45 > 2.5$$

we get, as a result, 4.45 which is strikingly larger than the constant 2.5. The formula is a criterion for linearity and the result obtained from the formula determines the linearity or curvilinearity by the extent to which it is equal to or greater than 2.5. We may then conclude that the regression of cost per pupil on size of school is non-linear. In this case the distribution is non-linear and the product moment formula is inapplicable.

In similarly treating the cost per pupil for total current expenses for all the schools, we find that $r = -.315 \pm .033$ and eta $= -.482 \pm .031$.

It appears that the grouping is too coarse and that there are insufficient instances among the larger schools. Under such circumstances the eta would necessarily be high since it would pass through the mean around which there would be no spread and hence the eta would have no meaning.

Instead, therefore, of grouping the schools by class intervals of 200, they are grouped by intervals of 50 and only schools up to 1400 in enrollment are included.

In order to ascertain whether the grouping in class intervals of 50 was sufficiently fine, a check was made by the application of the Pearson formula referred to by Dr. Kelley:[3]

$$f\eta^2 = \frac{\eta^2 - \frac{K-1}{N}}{1 - \frac{K-2}{N}}$$

[2] Blakeman, J. *Biometrika*, IV, pp. 349-350.
[3] Kelley, Truman L. *Statistical Method*. New York: The Macmillan Co., 1924.

A checking for fineness showed that eta was $-.544$, a difference so slight from the eta found in the distribution (which was $-.588$) as to be of little significance. The data evidently are properly grouped.

COST FOR TEACHERS' SALARIES

The relationship between cost per pupil for teachers' salaries and size of high school shows an eta of $-.458 \pm .32$ when the entire group of schools is included, indicating that size of school influences the cost for teachers' salaries. The distribution has a tendency to curve upward rather abruptly until the size of approximately 500 is reached.

COST FOR TOTAL CURRENT EXPENSES

In calculating the eta for the cost per pupil for total current expenses and size of school, we find that eta $= -.588 \pm .027$. This negative relation is greater than was found between cost per pupil for teachers' salaries and the size of school; it is moreover a more significant index since it represents all current expenses, including teachers' salary.

FITTING CURVE TO DISTRIBUTION

To get a quantitative expression for the "law" of relationship between cost and size of high school, it is necessary to fit a curve to the observations. The fitting of the curves to the observations was done by the method of least squares. The mathematical relationship between cost for teachers' salaries and size of high school is expressed by the formula:

$$(x - 0.25)^{0.705} (y - 121.4) = 125.8$$

The mathematical relationship between cost for total current expenses and size of high school is expressed by the formula:

$$(x - .02)^{0.525} (y - 138.42) = 246.62$$

RELATIONSHIP BETWEEN COST AND SIZE OF SCHOOLS ABOVE 500

That size is a more influential factor in determining the cost of schools under 500 than it is in schools larger than 500 is indicated by correlations between size and cost which were computed among the schools of the state with enrollments of from 500 to 1400. The r computed between teachers' salaries and size was found in this case to be $-.070 \pm .099$. The correlation between current expenses and size was found to be $-.044 \pm .113$. At an enrollment beyond approximately 500 there is no definite relationship between cost and size of California high schools.

CURRICULAR ACTIVITIES IN RELATION TO SIZE OF SCHOOL

Curricular offerings as here considered include all the courses offered in the different high schools of the state. The attempt has been made to ascertain the size of high school that offers practically as many courses as are offered in the larger schools of the state, while presenting a range of opportunity greater than that offered by the group of smaller schools.

SOURCES

The political code of California, section 1750, specifies that the course of study of each high school shall be approved by the state board of education. It further provides that the superintendent of Public Instruction is authorized to withhold all state apportionments from high school districts that do not fully comply with the provisions of the law.

The names of subjects offered in the various high schools were tabulated for the various departments as given in the high-school directory.

GROUPING OF COURSES

In working out the relationship between curricular offerings and size of school, the subjects of the curriculum were classified as conventional and non-conventional. Under conventional are included the older, or, what are usually considered the academic subjects. Under non-conventional courses are included subjects that are sometimes called the vocational subjects.

TREATMENT OF CURRICULAR DATA

The coefficient of correlation and the correlation ratio were each computed between size of school and the number of the various courses as classified under the conventional and non-conventional groups, and also the correlations were found for the conventional, non-conventional and for all the curricular courses taken together. The following table shows the relationship between the offerings and size of California high schools. It also reveals to what extent the r and eta differ, which indicates that a straight line does not describe the relationship and that the relationship is curvilinear.

The mathematical relationships between size of high schools and conventional courses, by the method of least squares, is expressed by the formula:

$$(x + 3.17)\ (29.33 - y) = 71.6$$

For the non-conventional: $(x + .19)^{.31}\ (18.46 - y) - 12.84$
and for all-curricular the formula is: $(x + .07)^{.151}\ (100 - y) - 83.39$.

TABLE III

CURRICULAR COURSES IN RELATION TO SIZE OF HIGH SCHOOL

	r	eta
Conventional Courses	.694 ± .020	.820 ± .013
Non-Conventional	.554 ± .027	.81 ± .013
Mathematics	.379 ± .034	.605 ± .025
Science	.544 ± .028	.659 ± .022
Social Sciences	.401 ± .033	.544 ± .028
Languages	.742 ± .017	.804 ± .014
Practical Arts	.451 ± .031	.743 ± .017
Commercial	.476 ± .030	.667 ± .022
Special	.571 ± .026	.751 ± .017
All Curricular	.655 ± .022	.858 ± .010

EXTRA-CURRICULAR ACTIVITIES IN RELATION TO SIZE OF HIGH SCHOOL

For the purpose of securing data on this subject questionnaires were sent to all the high-school principals of the state. Returns were received from 98 percent of the total number of questionnaires sent out. The extra-curricular activities for the purposes of this study have been grouped under five main divisions: athletics, or physical activities; social; literary or academic; art, and business and miscellaneous. The

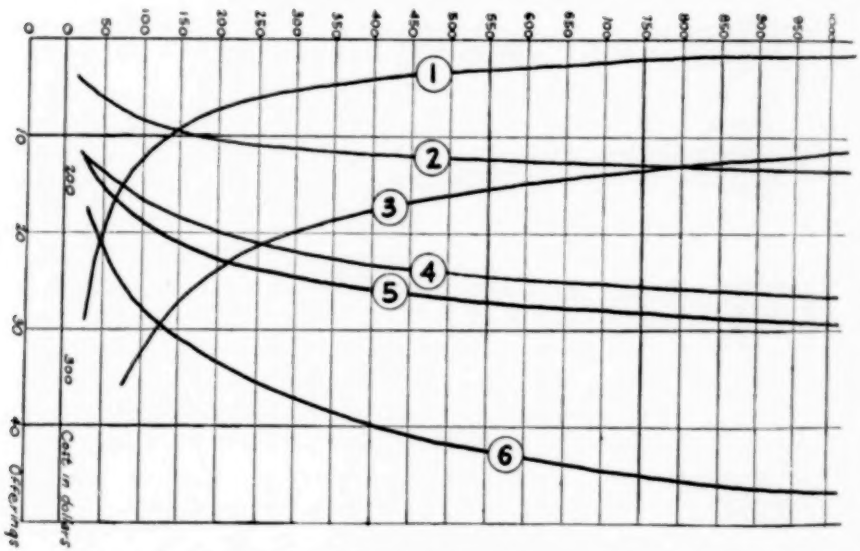


FIGURE 2.—THE RELATION BETWEEN THE COST AND OFFERINGS AND THE SIZE OF CALIFORNIA HIGH SCHOOLS

(1) Cost Per Pupil for Teachers' Salary.
(2) Non-Conventional Courses.
(3) Cost Per Pupil for Current Expenses.
(4) Conventional Courses.
(5) Extra-Curricular Courses.
(6) All Curricular Courses.

method of treating the data is similar to the procedure for the financial and curricular material. The following relations for r and eta were calculated:

TABLE IV

	r	eta
Athletic or physical	.460 ± .032	.630 ± .024
Social	.145 ± .032	.464 ± .032
Literary and academic	.380 ± .035	.579 ± .027
Arts	.348 ± .035	.624 ± .024
Business and miscellaneous	.558 ± .028	.819 ± .013
All extra-curricular activities	.528 ± .023	.670 ± .022

The activities were checked for curvilinearity by the Blakeman formula with the following result: $6.55 > 2.5$. The distribution is obviously curvilinear and the correlation ratio or eta was used in finding the two relationships under consideration. The curve for the total distribution of extra-curricular activities was secured by employing the method of least squares and is expressed by the formula:

$$(x + .32)^{.44} (36.36 - y) = 27.40$$

GENERAL SUMMARY AND CONCLUSIONS

1. In a study of California high schools, it has been found that the relationship between cost per pupil for teachers' salaries and size of high school is curvilinear. The distribution being non-linear, the coefficient of correlation formula is inapplicable when used in showing the relationship between cost and size of school from the smallest to 1400 in size. The coefficient of correlation has its significance, however, when used in comparison with the correlation ratio in order to show curvilinearity.

2. The relationship between cost per pupil for teachers' salaries and size of high school reveals an eta of $-.458 \pm .032$.

3. The negative relationship between cost per pupil for current expenses and size of school is eta $= -.588 \pm .027$ and $r = -.419 + .034$.

4. The curve representing the distribution of cost per pupil for total current expenses and also the curve representing the distribution of cost per pupil for teachers' salaries and size of high school, reveals that there is a steady decrease in cost up to a school of approximately 500 in enrollment.

5. The cost remains approximately the same for schools of from 500 to 1400 in size. The correlations between cost and size computed among these schools show that the cost per pupil for teachers' salaries

has a coefficient correlation of .070 ± .099. The correlation of the total current expenses with size r = .044 ± .132.

6. Some schools larger than 500 have a low per capita cost and some have a large per capita cost, thus showing that, in the larger schools, other factors besides size influence the cost of education.

7. The offering in the conventional group increases with size until a school of approximately 500 to 600 is reached. The relationship between the conventional courses and size of high school reveals an eta of .820 ± .013 and an r of .694 ± .020.

8. Schools of 500 in size offer more non-conventional courses than the smaller schools offer. Correlations computed between non-conventional courses and size of high school give an eta of .81 ± .013 and an r of .554 ± .027.

9. As the high schools become larger than 500 in enrollment, the conventional and non-conventional offerings increase but slightly with size and the relationship for all the curricular offerings is here shown to be r = .021 ± .101.

10. The total number of extra-curricular activities increases regularly from 12, the mean number of activities for schools having an enrollment of 50 or less, to 25, the mean number of activities of schools of 500.

11. Schools of greater enrollment than 500 the relationship between extra-curricular activities and size of school is expressed by r = − .126 ± .084. Schools with 500 enrollment offer close to the maximum of extra-curricular activities.

12. When the curves obtained from the "best fit lines" representing the cost and offerings of California high schools are presented on a single chart, it is evident that a school of from 500 to 600 in enrollment offers more courses and provides more activities and costs less than the smaller schools, and moreover, offers and costs approximately the same as the largest schools of the state.

A GRAPHIC MATCHING TEST FOR PROPERTIES OF FREQUENCY DISTRIBUTIONS

KATE HEVNER
University of Minnesota

Two of the often repeated criticisms against the "new type" or objective examinations are that (1) they often measure only small and detached details of information rather than general principles and real understanding of the subject matter, and that (2) they are a test of the student's ability to memorize rather than his ability to organize remembered facts and use them in solving problems related to the field covered by the examination. Because of these criticisms the objective questions are often found to be most satisfactory when used in combination with questions of the old style or essay type even though this latter type of question involves the expenditure of a disproportionately large amount of time in the reading of the papers, and is further objectionable because it is difficult to keep the standard of judgment constant throughout the reading.

Instructors in the Elementary Psychology Laboratory course in the University of Minnesota have been particularly interested in simplifying examination methods because of the large number of students who work in the laboratory. Approximately two hundred-fifty students register for this course every academic year, and it is important, therefore, to supplement the commonly used objective questions, not with the essay type discussion questions but with some objective questions designed especially to test the student's understanding of the subject matter and his ability to organize and interpret the facts he remembers. Several varieties of such questions have been tried out during the last few years, and the series described below has proved to be one of the most successful. Since the technique here described is concerned with elementary statistical concepts, it might prove useful in connection with courses in Experimental Psychology, Mental Testing, Individual Differences, or courses in any field where the rudiments of statistical methods are taught and an understanding of the simplest measures of central tendency and variability are necessary for the correct interpretation of experimental results.

The questions are not based on any particular statistical textbook. They require a half hour of the student's time and each paper can be scored in fifteen seconds, with an objective key. They occupy four,

eight and one-half by eleven, pages of mimeographed material, and the stencils for mimeographing may be cut easily by any careful typist.

The directions given on the first page of the test are as follows:

"After giving a College Ability Test to all the students registered at a large University, a psychologist made some studies of individual differences among the students, by plotting the frequency polygons for various groups along the same base line. In this way the important differences between any two groups which he wished to study became readily apparent.

"Below you have given the data for six such studies, and on the following pages, the graphs which were plotted from these same data. The scores for this College Ability test ranged from 0 to 130, and in all the graphs the scores were plotted along the base lines in step intervals of 5. It is not necessary to fill in these step intervals along the base lines, but only to remember that the lowest scores are always on the extreme left, and the highest scores on the right.

"Notice carefully the data for each of these studies, and try to imagine how they would look if they were represented graphically, then turn to the six graphs and decide which is the appropriate representation for each study. After you have matched the six graphs with the six studies, fill in the number of the study under each graph, and indicate under 'legend' which group is represented in dotted lines, and which in solid lines."

On the second page of the test are the statements of the six problems. Needless to say, these data are all fictitious.

"*Study No. 1.*

Group A represents one hundred students who maintained a C average throughout one quarter, and Group B represents one hundred students who maintained a B average. The mean for Group A is 36, and the σ is 12. The mean for Group B is 61, and the σ is 12.

"*Study No. 2.*

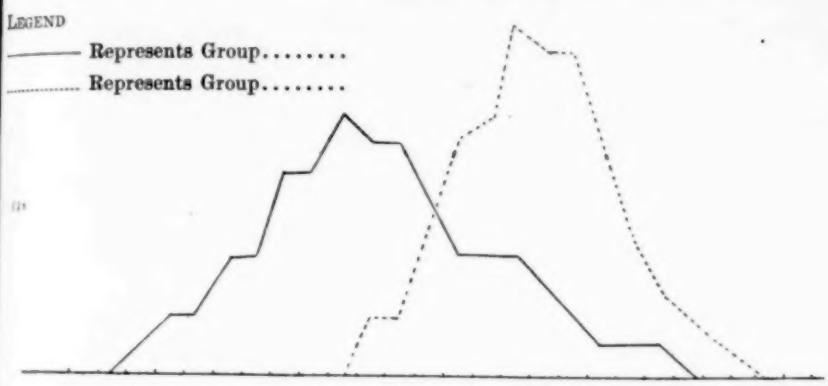
Group C represents 80 men students in a freshman mathematics class, and Group D, 80 women from the same class. The mean for Group C is 57, and σ is 22.5. The mean for Group D is also 57, and σ is 12.7.

"*Study No. 3.*

Group E represents 70 freshmen in a class in English Composition, and Group F represents a group of 70 sophomores in Advanced English Composition. In studying this sophomore group, it is noticeable that the students with the lowest College Ability scores have dropped out of college.

The mean for the 70 freshmen is 54.7 and σ is 18.5.

The mean for the 70 sophomores is 62.5 and σ is 14.2.



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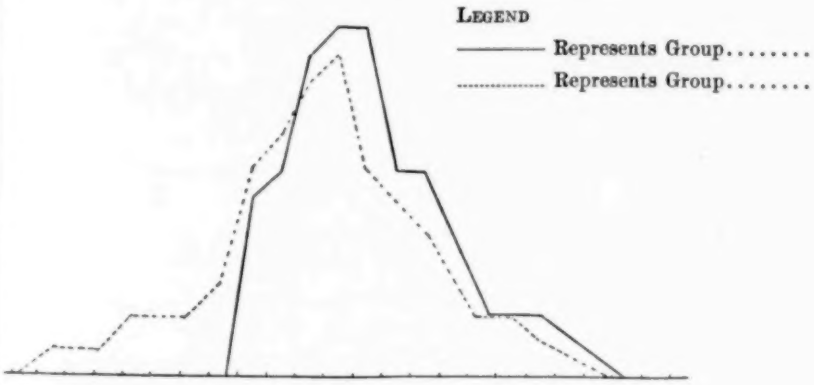

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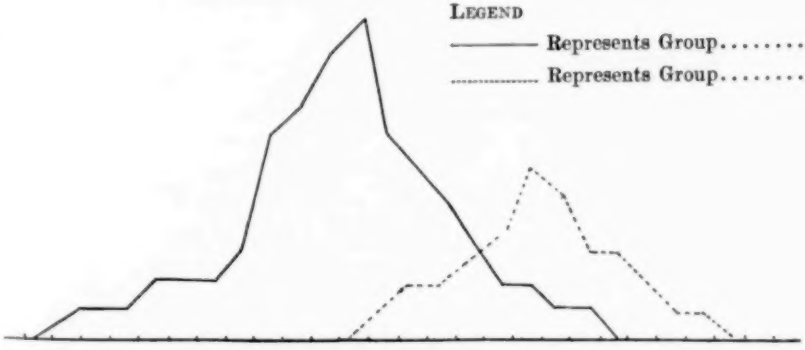

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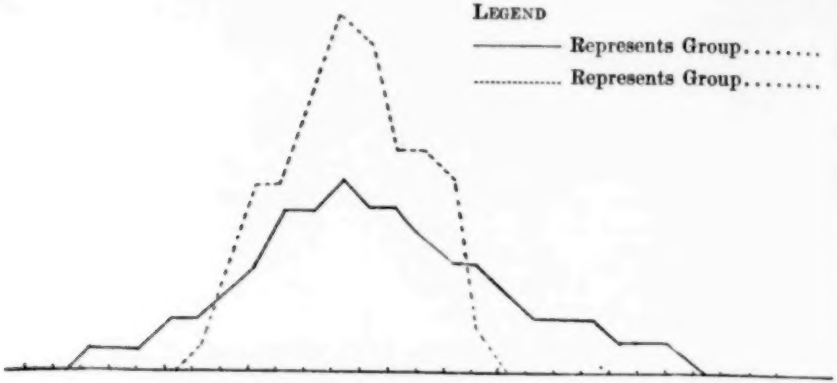

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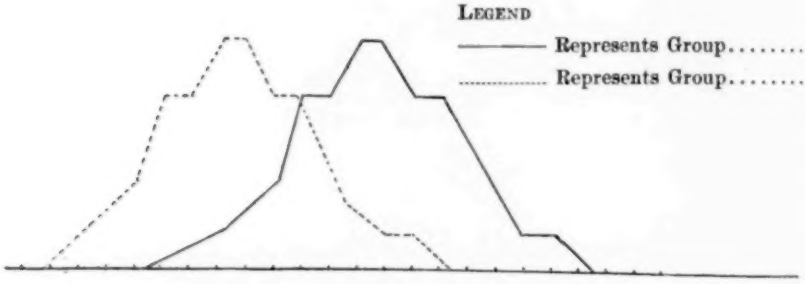

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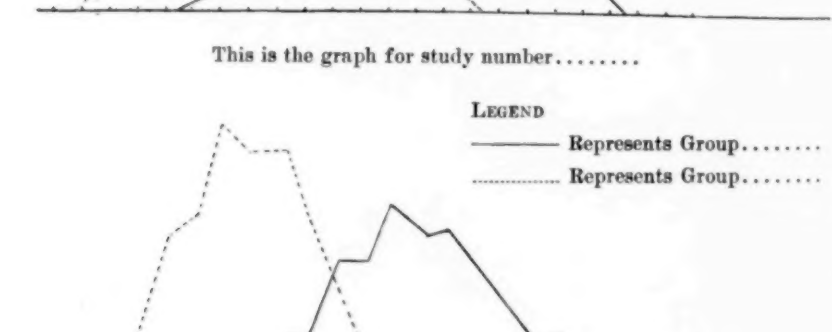

This is the graph for study number.....

"*Study No. 4.*

Group G represents a group of 80 Freshmen and Group H a group of 30 Graduate Students.

Group G has a mean of 54.5, and a quartile deviation of 12.4. Group H has a mean of 89, and a quartile deviation of 8.7.

"*Study No. 5.*

Group I represents a typical group of 100 sophomores in the College of S. L. & A. and Group J represents a group of 100 sophomores in the medical school. The mean for Group I is 68.5 and the σ is 18.7. The mean for Group J is 96, and σ is 12.9.

"*Study No. 6.*

Group K represents a typical group of 100 sophomores in S. L. & A. and Group L represents 100 students who are on probation because they have failed to meet academic requirements.

Group K has a mean of 68.5 and a σ of 18.7.

Group L has a mean of 36 and a σ of 12.9.

On the third and fourth pages of the test the frequency curves are outlined.

In scoring these questions a credit of one point was allowed for matching the graph with its proper problem, and a credit of one for each item of the legend. This amounted to a total of eighteen points, *i.e.*, three points for each of the six problems. The additional points for the legend merely added weight to the scores on these questions and some other system of scoring might prove equally appropriate.

The new test, in exactly the same form as stated above, was used in the mid-term examination at the end of twelve two-hour periods of laboratory work. It comprised eighteen of the seventy-eight possible points, or approximately 23 percent of the whole examination. The other questions included a "matching" question on statistical definitions and terminology, and a number of "multiple choice" questions (four alternatives) covering psychological facts, methods and principles. Most of these questions were taken from the files in the Minnesota Laboratory and were of proved worth and known discriminatory value. In the group of 178 laboratory students the range of scores for the new test was from 0 to 18, with the mean at 10.3, and the quartile deviation 4.11. In the question by question analysis of this mid-term examination the eighteen new items were found to have uniformly high discriminatory values. For example, when the 178 papers were divided into quarters on the basis of the total scores in the whole examination, the percentage of students in the highest quarter responding correctly to study number five was 91 percent,

in the second highest quarter 64 percent, in the next, 33 percent, and in the lowest quarter only 17 percent. The percentages for the other studies and for the correct labeling of the legend approximate these figures very closely.

The percentage of laboratory students who were able to match each study with its appropriate graph is listed below in the order of their difficulty:

Study number 3..... 70%
Study number 4..... 66%
Study number 2..... 64%
Study number 1..... 56%
Study number 6..... 53%
Study number 5..... 52%

When the differences between these percentages were tested with the probable error of the difference of percent, it was found that studies 1, 5 and 6 were significantly more difficult than studies 2, 3 and 4. In both studies 3 and 4, which were the easiest, there was a third item of information introduced which helped in identifying the curve. In number 3 it was the fact that the lowest students had dropped out and in number 4, it was the decided change in the population. In study number 2, the only one in which the means were identical, the coincidence of the modes of the two curves was perhaps too obvious a clue for many students to overlook.

The correlation (Pearsonian r) between the scores on the new test and on the matching question on statistical definitions was 0.40 which shows that the two kinds of questions on statistical work were measuring somewhat different abilities. The correlation between scores on the new test and the Minnesota College Ability Percentile scores was 0.13 which shows that the new test is not merely an intelligence test. The correlation between scores on the new test and the final grades at the end of the first term of the laboratory course, grades which were based on a final examination and the daily work of the student in performing and writing up experiments, as well as the mid-term examination, was 0.41.

On the basis of empirical analysis then, the new test proves itself entirely satisfactory, and from the nature of the questions it is obvious that the student must have a knowledge of the properties of the frequency distribution and an accurate concept of certain statistical measures in order to match the six problems with the six diagrams. Alternate

forms of the test may be arranged by altering the absolute numerical values of the measurements, and other properties of frequency distributions may be introduced by changing the nature of the curves themselves. The particular curves and problems described here were devised by first drawing the two curves in the desired relationship on cross section paper, then labeling the two axes with arbitrarily determined scales and then actually calculating the mean and the sigma for each curve. In this way an infinite variety of problems could be constructed with the mathematical data accurately proportionate in every respect to the outline of the frequency curves.

SHORTER ARTICLES

THE FUNCTIONS OF BUREAUS OF RESEARCH

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State Director of Research, Dover, Delaware

THE present article is part of a study made by the writer during 1929-30 of the bureaus of research in cities of 100,000 population or less. This study attempts to answer two questions: first, what the bureau now is, and second, what the bureau should do and be.

This paper will take up three phases of the problem. These are (1) the functions now being performed by bureaus of research in cities of the size above mentioned, (2) the functions which, in the estimation of the directors, the bureaus should perform, and (3) the general order of importance of the functions.

In order to obtain the necessary data, a questionnaire was sent to ninety cities throughout the country. Replies were received from approximately two-thirds of these cities. In this questionnaire the directors were asked to check the functions which the bureau was at present performing or ready to perform, to check those functions which, in their estimation, the bureaus should perform, and to rank in order of importance the six functions which they believed to be of the most importance. By doing this it was hoped that it would be possible to select the functions which in the estimation of those actually engaged in the work the bureaus could and should perform. In answering the various parts of the questionnaire, the directors were reminded of the limitations of bureaus in smaller cities, and were requested not to base their replies upon the facilities which the more adequate personnel and financial support of the larger cities could provide.

THE INFORMATION SECURED FROM THE QUESTIONNAIRE

In Table I the percentage of bureaus performing each function, and the percentage of directors who believed each function should be performed, are given. The rank of each function in the list with respect to the frequency of performance by the bureaus and frequency of mention as a function to be performed (proper) is also given.

TABLE I

FREQUENCY AND RANK OF FUNCTIONS PERFORMED AND FREQUENCY AND RANK OF MENTION AS FUNCTIONS TO BE PERFORMED AS INDICATED BY DIRECTORS OF BUREAUS OF RESEARCH

Name of Function	Frequency of Mention Performed		Proper	
	Percent	Rank	Percent	Rank
Achievement tests	100	1½	100	2
Mental tests	100	1½	100	2
Classification	94	3	100	2
Surveys	83	4	93	4½
Pupil personnel problems	73	5	91	6
Organization and supervision of special classes	71	6	86	10
Special investigations other than surveys	69	7	88	7½
Devising record and report forms	65	8½	84	12½
Educational and vocational guidance	65	8½	86	10
Experimental study of curricular and instructional problems	58	10	93	4½
Test construction	56	11	84	12½
Educational information	52	12	79	15
Psychological clinic	46	13	88	7½
Training teachers for special testing	44	14	81	14
Experimental study of administrative problems	42	15	86	10
Publicity service	33	16	72	16

The data of Table I show that only four of the functions mentioned in the list of sixteen were being performed by three-fourths or more of the bureaus. These were achievement tests, mental tests, classification and surveys. Three-fourths or more of the directors, however, considered each one of the sixteen functions a function which should be performed by a bureau of research. There is, then, some difference between what a bureau actually does and what the director thinks it should do. A comparison of the ranks of each function in these two respects will show the points of agreement and disagreement.

Several interesting facts are shown by this comparison. With the exception of a few functions, which will be considered later, the ranks agree rather closely. We find that the four functions that rank highest in frequency of performance rank highest in frequency of mention as functions which should be performed, and that those which rank lowest in the one also tend to rank lowest in the other.

Special attention is called to the three functions: experimental study of curricular and instructional problems, experimental study of administrative problems, and psychological clinic. The first, experimental study of curricular and instructional problems, is performed by 58 percent of the bureaus, but 93 percent of the directors consider it a

function which should be performed. With respect to the second, experimental study of administrative problems, only one-half as many bureaus perform this function as those that consider it a proper function. The same applies to the psychological clinic.

The significant fact about the foregoing is that each of these functions requires highly trained assistants, clerical assistance, and financial support, which is frequently not accorded the directors of bureaus in small cities. It also points out that most directors desire to carry on a more extensive program than they do at present. The question here arises as to how many functions a bureau of research in a city of 100,000 population or less, assuming a personnel and financial support which will not burden the school district, can efficiently perform and, if it cannot perform all of the above, which ones are the most important and render the most service to the schools.

THE RELATIVE IMPORTANCE OF THE FUNCTIONS

All of the directors did not answer that part of the questionnaire which asked them to rank the functions in order of importance. Some stated that "it was impossible to do this" or "depends upon local conditions." Thirty-nine directors, however, did rank the functions. Data from this source are given in Table II.

TABLE II

RELATIVE IMPORTANCE OF FUNCTIONS AS REPORTED BY THE DIRECTORS OF THIRTY-NINE BUREAUS OF RESEARCH IN PUBLIC SCHOOL SYSTEMS

Name of Function	Frequency of Mention		Mdn. Rank
	Number	Percent	
Achievement tests	26	67	2
Mental tests	23	59	2½
Experimental study of curricular and instructional problems	18	46	2¾
Classification	30	77	3
Test construction	3	8	3
Educational and vocational guidance	15	39	3
Experimental study of administrative problems	13	33	4
Organization and supervision of special classes	19	49	4
Pupil personnel problems	20	51	4
Surveys	14	36	4½
Training teachers for special testing	5	13	5
Publicity service	3	8	5
Psychological clinic	18	46	5
Special investigations other than surveys	8	21	5¼
Devising record and report forms	2	5	5½
Educational information	7	18	6

To be read as follows: In ranking the functions in order of importance, achievement tests were mentioned by twenty-six directors among the first six in importance. This was 67 percent of the number of directors who answered the question. The median rank assigned achievement tests was two.

The data from which Table II was derived, more so than the table itself, show the disagreement among the directors as to the relative importance of the functions usually performed. They show that nine of the sixteen functions in the list were marked one or more times as the most important function and another had a rank of one and one-half. All of the functions were mentioned two or more times among the first six in importance. Classification was mentioned by thirty, or 77 percent of the directors, and devising record and report forms were mentioned by two. The other functions were included varying numbers of times between these extremes.

With the exception of one function, surveys, there is marked agreement between the functions ranking high in importance and the frequency of mention as functions to be performed. Surveys were mentioned by 93 percent of the directors as a function which should be performed, but only fourteen or 36 percent of the directors include it among the first six in importance. Evidently, it is necessary to perform this function although not so important as some of the others.

Table II shows that but four of the functions were mentioned by a numerical majority of the directors as among the first six in importance. These were achievement tests, mental tests, classification, and pupil personnel problems. Three other functions, experimental study of curricular and instructional problems, psychological clinic, and organization and supervision of special classes were mentioned by approximately half.

The general order of importance of the functions usually performed by bureaus of research as determined from the ranks assigned by the directors of such bureaus and given in Table II is:

1. Achievement tests
2. Mental tests
   Experimental study of curricular and instructional problems
3. Classification of pupils
4. Special classes
   Pupil personnel problems
5. Psychological clinic.

SUMMARY

1. The median number of functions performed by bureaus of research in cities of 100,000 population or less is twelve. These, in order of frequency of performance, are: achievement tests; mental tests; classification; surveys; pupil personnel problems; organization and

supervision of special classes; special investigations other than surveys; devising record and report forms; educational and vocational guidance; experimental study of curricular and instructional problems; test construction and educational information.

2. The directors of the bureaus believe that additional functions, not now performed by them, should be performed. These are chiefly the functions of an experimental nature.

3. There is more agreement among the directors in regard to the functions that should be performed by bureaus of research than in regard to the functions actually performed by the bureaus.

4. The directors of thirty-nine bureaus of research rank the various functions in regard to importance as follows: achievement tests, mental tests, experimental study of curricular and instructional problems, classification, organization and supervision of special classes, pupil personnel problems, and psychological clinic.

5. For the most part, the functions which the directors indicate as important are performed most frequently by bureaus of research. They are also considered by the directors as the functions which the bureau should perform.

PRACTICE EFFECT

DONALD SNEDDEN
New York University

1. IT is generally admitted that if Test A be given to a group of children one week and given again a week later that the mean score (or M.A. or I.Q.) will be higher the second time due to "practice effect."

2. It is also generally recognized that if Form A of Test A be given one week and Form B of Test A be given the following week the scores on Form B (if the forms are of equal difficulty) will be higher than on Form A, again due to "practice effect," although in this case the gain to be expected is not as large as that in which the same test is repeated, since the practice is only on the mechanics of the particular test and not on specific items.

3. It is further believed that if Test A be administered to a group of children one week and Test B, a test largely or to some extent different in mechanics, be given the next week there is likely to be some increase in score due in part to the common elements of mechanics in the two tests, and in part to the common elements in the situation "taking a new kind of test."

With the increasing practice, and it is a practice strongly to be recommended, of not relying too heavily on one test, but combining test scores, it behooves us to know more than we do about practice effect under the three conditions above stated.

There have been various studies of increase in IQ over a period of one year (these are summarized in Chen "Comparative Coachability of Certain Types of Intelligence Tests"), but the year interval is not the same problem as the one confronting us. Our interest in this study is with what happens when tests are given a week apart. In schools where it is desired to give two tests and average the results, a week is a convenient interval. The averaging of the test results is always a little precarious, as we know, for differences in standardization of different tests often give us results considerably different with one scale than with another. This difficulty, however, is not helped by having included in the second test an unknown amount of practice effect. The following experimental results give some rough indication of how great this effect may be. In the Cambridge, Mass., public schools[1] in November, 1929, ten sixth grade classes were selected. These classes were chosen as "average" sixth grades. The poorest and the richest residential sections were not drawn upon, and foreign language difficulties were mainly avoided. That the classes were not wholly equal can be seen by inspection of the following table, but the relation between initial score and gain is known to be not of sufficient size wholly to invalidate our comparisons.

TABLE I

Group	First Test	Interval one week	Second Test	N	First Mean I.Q.	Second Mean I.Q.	Difference 2nd M I.Q.— 1st M I.Q.
1.	Nat. A1		Nat. A1	31	87.6	94.7	+ 7.1
2.	Hag. Delta 2		Hag. Delta 2	33	105.5	111.9	+ 6.4
3.	Dear. C		Dear. C.	35	92.7	103.7	+11.0
4.	Otis S.A. "A" Intermediate		Otis S.A. "A" Intermediate	36	86.3	93.9	+ 7.6
5.	Nat. A1		Nat. A2	39	95.3	98.8	+ 3.5
6.	Nat. A1		Nat A3	40	97.9	99.9	+ 2.0
7.	Nat. A1		Hag. Delta 2	43	94.6	96.5	+ 1.9
8.	Hag. Delta 2		Nat. A1	39	100.4	101.3	+ 0.9
			Weighted Mean		97.4	98.8	+ 1.4
9.	Otis S.A. "A" Intermediate		Dear. C.	39	96.7	103.0	+ 6.3
10.	Dear. C.		Otis S.A. "A" Intermediate	37	103.2	101.3	— 2.0
			Weighted Mean		99.9	102.2	+ 2.3

[1] Through the coöperation of Superintendent Fitzgerald and Miss Gertrude Duffy, psychologist.

So far as was known none of the children had taken intelligence tests before. In each case, the same examiner gave the second test to the group to which he had given the first test. All scoring was completely checked. It is not pretended that this experiment is wholly conclusive, but it is believed that the following generalizations are in order:

For more or less normal sixth grade children who have not taken intelligence tests before, the practice effect on the repetition of a group test in one week will tend to raise the I.Q. about 7 points. This is slightly over one-half of what is usually accepted as the S.D. of I.Q.'s in a normal group (12). This practice effect, at this level, seems to be higher for the Dearborn C than for the other tests. The Dearborn C is more "non-verbal" than the others.

For groups 5 and 6 the repetition was of a different form of the same test. This represents a more usual situation and from our data we may say that the practice effect tends to raise the I.Q. less than half as much as when a test is repeated.

Groups 7 and 8 and groups 9 and 10 represent rough attempts to measure the practice effect of one test on another different test (although containing some of the same testing mechanics). By reversing the order of the tests and averaging weighted I.Q.'s for first trials and I.Q.'s for second trials, probably most of the difference, if any, in standardization is removed.

That this is a perfected technique is not for a moment claimed, but if general Test A is standardized 5 I.Q. points "harder" at this level than Test B, then these 5 extra points occur with about equal weight in the first trial mean I.Q. and the second trial mean I.Q. The difference that is left may be attributed, loosely, to practice effect. From these data, however, we cannot tell whether going from Test A to Test B gives large practice effect, and going from Test B to Test A gives a small effect. In the absence of evidence, our most reasonable assumption is that the A → B effect is about the same size as the B → A effect.

This practice effect seems to be in the neighborhood of 2 points I.Q. This is not of very significant magnitude. It is considerably less than the probable error of any at present obtainable I.Q.

It must be understood that these practice effects under discussion are mean practice effects and actual individual practice effects are affected by regression and by individual idiosyncrasy.

The difference between this type of practice effect and that obtained when giving different forms of the same test, is probably not significant. The difference between these effects and those obtained by repeating the same test are probably significant. The repeating of the same test is

certainly not to be recommended and is not often necessary, as a large number of available tests are published in two or more forms. The National Test, it may be noted, is standardized on the basis of Scale B being given "a few days" after Scale A. As regards the practice effect in this sequence it is non-existant, since it was allowed for in the standardization.

In general, few schools can afford to give individual intelligence examinations to all pupils. The cost would be prohibitive under present conditions. But schools are more and more coming to realize that, for a variety of reasons, it is very much worth while to have intelligence test scores on all pupils. A single group intelligence test usually gives results that are sufficiently unreliable to render them of doubtful value for individual work. By combining two or more group tests, however, results can be obtained that compare, with regard to reliability, very favorably with the best individual examinations. This practice is to be recommended, but the tests used to reduce the practice effect to a minimum must be different tests. Since this introduces differences in standardization, it is probably more useful to use different forms of the same test. The National Test is the one test, probably, best constructed in this respect.

Further it is suggested that a large part of the practice effect comes from the fact that most of our current intelligence tests are highly "speeded" instruments. Every second counts. This permits a child who recognizes the items of a test, or who recognizes the mechanics of a test, to be doing the first items mentally while the examiner is reading the somewhat lengthy directions, and permits him thus to get a better score than if he paid strict attention to the examiner during the reading of directions. It may be assumed that "power" tests, or tests that have very liberal time limits and carefully graded difficulty of items, tend to reduce practice effect.

It may further be assumed that sufficient "fore exercise" tends to reduce practice effect.[2] It is interesting to note that the only one of these tests used in the above study that does not have practice material on separate pages from the tests themselves is the Dearborn C, and this shows the largest repetition practice effect (Group 3). That this may not wholly be caused by lack of practice material must be admitted, for, as before noted, the Dearborn C is the most "non-verbal" of all the

[2] Thorndike, E. L. "An Instrument for Measuring Certain Aspects of Intelligence in Relation to Growth, Practice, Fatigue, and Other Influences." *Journal of Experimental Psychology*, V (1922), pp. 197-202.

tests. It is possible that the non-verbal test, with its more non-academic set-up and its (usually) smaller number of items (meaning more time per item unit) is more susceptible to practice effect.

Fifteen years ago, when most children were not tested and the exceptional child might be tested once, practice effect, while interesting, was not crucial. Now most children are being tested and retested in progressive school systems. Children are getting "test wise" and we must not think that our standards, many of which are largely based on the children's first tests, are exactly accurate.

SUMMARY

Ten sixth grades in the schools of Cambridge, Mass., were given two group intelligence tests each, with an interval of one week between the two tests.

A. Where the same group test was repeated, the practice effect is fairly large, being in the neighborhood of 7 points IQ.

B. Where another form of the same test was given after the week interval, the practice effect was smaller, being not more than 3.5 points IQ.

C. Where an entirely different test was given after one week, the estimated practice effect was less than 2.5 points IQ.

These conclusions are, of course, rather specific to the grade tested, the tests used, and the time interval used, and are mean effects. It is also to be noted that they apply to children who have not previously been familiar with test-taking technique.

EDITORIALS

CAUSAL INVESTIGATIONS IN SUPERVISION AND TEACHING

THERE are two widely different sorts of situations in supervision and teaching that demand the causal type of thinking, and that are not always clearly distinguished by field workers.[1] In one of these situations the investigator is primarily interested in determining the circumstances common to a number of instances of some phenomena: as for example, the causes of unsatisfactory pupil achievement, the causes[2] of inefficiency among teachers, the causes of the break down of social institutions, etc. When such is the investigator's purpose he commonly uses the logical principles of *agreement* or *joint agreement*, or he may employ the principle of *difference*.[3] While the method of differences (the experimental method) is usually not thought of as a method of causal thinking, it is, however, such, since in determining the relationships between circumstances and events in teaching, learning, and supervision one really determines the factors conditioning pupil and teacher achievement. The absence of any one of these factors may become the causes of unsatisfactory teacher or pupil achievement.

The situation calling forth the second type of causal thinking is quite different from that calling forth the first. In the second instance the investigator is no longer interested in determining the causes common to a number of instances of unsatisfactory achievement, but the causes of unsatisfactory achievement in a particular instance of teaching, learning, or supervision: as for example, the causes of unsatisfactory pupil achievement in a particular case of third grade reading. This latter type of causal thinking is an exceedingly common one: as for example, when the performance of one's car becomes unsatisfactory is usually is taken to the garage for observation. The mental steps of the mechanic to whom it is entrusted are about as follows: (a) He first checks the performance; (b) he then recalls to mind, out of his past training and experience, the probable causes of poor performance; (c) he chooses one of the probable causes of poor performance as the most probable;

[1] Barr, A. S. *An Introduction to the Scientific Study of Classroom Supervision* (New York: D. Appleton and Company, 1931), pp. 116-120.

[2] The word "causes" is here used for "antecedent" because of its more common usage.—Westaway, F. A., *Scientific Method* (London: Blackie and Son, Limited, 1924), pp. 146-161.

[3] Westaway, F. A. *Scientific Method* (London: Blackie and Son, Limited, 1924), pp. 203-214.

(d) he checks the absence or presence of the supposed cause (in case the guessed cause is not present, he chooses another); (e) he makes the necessary adjustments; and (f) again checks the performance. A large amount of the thinking done by teachers and supervisors in concrete teaching situations is of this sort.

The purpose of this editorial is not so much to describe the nature of these two processes of thinking[4] as it is to show their intimate relationship in the diagnosis of teacher-pupil difficulties. It has been frequently pointed out that the logical methods of agreement, difference, etc., aim merely at the establishment of general relationships; it having been determined by these methods that age, sex, intelligence, interest, etc. are factors conditioning the achievement of teachers and pupils, it is left to the practitioner to determine the operation of these factors in specific teaching, learning, and supervisory situations. While it is a well known fact that intelligence conditions achievement, it may not be the cause of unsatisfactory achievement in a great many of the instances calling for the attention of the practitioner. The mental steps involved in a complete act of thought of the second type have been outlined above. A significant relationship between the two types of thinking is brought out in the second step, namely, the recall, from science and experience, of the probable causes of unsatisfactory performance. The function of science in this instance is to narrow the range of choice thus rending the diagnosis more effective. One may ignore the findings of science if one desires to do so, and depend upon experience, but in doing so one should be thoroughly cognizant of the possibility of error when one depends upon uncontrolled observations in such complex phenomena as teaching, learning, and supervision. In any case science offers a useful supplement to experience in causal thinking.

Another important relationship between the two methods of thinking is brought out by the check that the one provides for the other. Let us suppose that the teacher or the supervisor has come upon an established instance of poor pupil achievement in addition. He will doubtless array in his thinking the different causes of poor achievement; experience will tell him that the causes of unsatisfactory pupil achievement in many instances are not single but many in number. He will determine the presence or absence of the supposed causes of poor work, make the necessary adjustments, and measure the results. Failure to secure satisfactory achievement may be attributed: (a) to the importance of the factors chosen; (b) to a poor choice of factors; or (c) to the ineffectiveness of the adjustment program. As the practitioner gains experience in diagnostic work, that is, as he multiplies instances, particularly if he observes the law of the single variable, adjusting one assumed cause at a time, he will gradually come to see the accuracy of the science or experience that serves him. Thus science furnishes in practice its own check.

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[4] Barr, A. S. "Case Study Method in Education," Editorial, *Journal of Educational Research*, XXII (June, 1930), 59-60.

An interesting by-product of the above analysis is the light that it throws upon the importance of being well informed. One almost gets the impression from some current discussions of teaching that information is a decided handicap. From the instance of thinking analyzed above, it should become apparent that the effectiveness of this type of thinking depends upon being well informed. It is to the store house of information gained through reading, observation, and first hand experiences that one must turn for guidance in causal thinking. Expertness here depends upon training, experience, and intelligence.

The purpose of this editorial has been to clarify a bit, if possible, the relation of knowledge, science, and experience in causal thinking.

A. S. Barr.

REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

KILCULLEN, MAE T. *Materials and Methods of Geography Teaching.* Chicago Heights, Illinois: Weber Costello Company, 1931. 218 pp.

There has been a real need for an interesting and effective approach to map study that would challenge the attention of the student of geography, especially those in teachers colleges, and at the same time provide suggestive materials and methods of presentation that could be readily used by the busy teacher in service. A book of this sort, to merit such universal consideration, should be written as a result of thorough knowledge of geography and experience in the presentation of the materials to pupils of elementary grades, high school, and teacher training institutions. This book meets such exacting conditions, both as to content and authorship. It should be a valuable and welcome addition to the library of the geography teacher.

R. W. FAIRCHILD
Northwestern University

EELLS, WALTER CROSBY. *The Junior College.* Boston: Houghton Mifflin Company, 1931. xvii + 833 pp.

This book is divided into three main divisions. Part I is devoted to the *Development of the Junior College*, including summaries of facts and investigations concerning its history, standards, and functions; Part II treats the *Organization and Administration of the Junior College*, largely a digest of the work of investigators; Part III, *The Place of the Junior College in American Education.* This latter part is largely controversial and is by far the most interesting and readable portion of the book. Here Doctor Eells presents his case for the two-year junior college.

The author "feels that the junior college is not to be merely an appendix to the high school, nor merely a prefix to the university, but that it can and should have an individuality and personality of its own." Although not disposed to press terminology, he favors *collegiate* as the special term to designate the junior college, as opposed to either *secondary* or *higher* education.

Most interesting is Doctor Eell's attack on the four-year junior college, enumerating and refuting the eleven arguments commonly used in advocating this plan. Eells fails to see how many of these arguments apply to the four-year junior college with any more force than to the two-year college. I. *The psychological argument* is refuted by the gradual theory of psychological development, with the further assertion (after Campbell) that there has been no experimentation to fit the junior college to the period of later adolescence. II. *The articulation argument*, which hinges on overlapping and duplications, is met by Proctor's work at Sacramento, where there is no more duplication than at Pasadena. III. *The economy of cost argument*, it is pointed out, is not applicable where the two-year junior college is in the

wing of another building, the usual arrangement. IV. *The economy of time argument* is termed theoretical, the author favoring *time* as being more basic than *material* studied. V. *Cooper's vocational preparation argument* is said to fit the two-year college as well or better than it does the four-year school. The remaining six arguments are easily disposed of. A list of six disadvantages is then given, some mere matters of expediency and others as flimsy as those Eell's attacked.

Eells sees eight advantages in the two-year college: (1) Ease of adjustment to existing administrative and geographical conditions; (2) advantages of new contacts—three such experiences instead of two; (3) transitional changes—the junior college bridges the gap between secondary and higher education; (4) the development of leadership; (5) vocational preparation—after Leonard; (6) homogeneity of age—more nearly homogeneous at any rate; (7) a more distinctive collegiate atmosphere; and, (8) psychology of the American people—not likely to be easily sold on "a centaur like hybrid, half high school and half college." These arguments can hardly be taken at face value but may counterbalance some of those employed by the 6-4-4 advocates.

No book now on the market gives such a thorough insight into the myriad of problems of the junior college as does this book.

JOHN T. WAHLQUIST
University of Utah

RUSSELL, CHARLES *Classroom Scaler and Grader.* Boston: Ginn and Company, 1931.

Russell's *Classroom Scaler and Grader* consists of several slide sheets, a holder, and a 16-page booklet of instructions for use. The appropriate slide sheet is inserted in the holder and the desired information is read through a slit in the holder.

The teacher first determines the proportion of her pupils who should receive each of five grades by giving intelligence and achievement tests. Later, when the pupils have taken a test, they are ranked according to their scores. The best fitting slide sheet is selected, inserted in the holder, and each pupil's grade is determined without computation.

Slide sheets are also provided for determining M-scale grades, effort scores, and achievement ratios. For an explanation of M-scale grades, the user is referred in the booklet of instructions to another publication by the same author.

Teachers who are informed as to late developments in tests and testing, achievement ratios, and the like, and who are committed to the use of the M-scale technique will doubtless find that they can save time and reduce errors through the use of this mechanical device.

The word "quartile" is apparently used with two meanings. It is correctly used when employed to indicate points which divide a distribution into fourths and incorrectly used when employed as a synonym for "fourths" or "quarters."

Ohio University R. L. MORTON

RUGG, HAROLD. *Culture and Education in America.* New York: Ginn and Company, 1931.

"Culture and Education in America" is a comprehensive treatise on the motives, technology, and scope of thought and social processes in American life.

As characteristic of its author it departs much from the usual forms of texts on culture, such as those by Powys, Shaw, or Counts, and selects a new set of factors and controls.

The dedication of the book itself is unique: "This book is dedicated to a

company of creative students of American culture. John Dewey, for phrasing clearly the Experimental Method of Knowing; Charles Beard, for his documentation of the Interrelationships of Economic, Political, and Social Life; Louis Sullivan, integrator of American culture; Alfred Stieglitz, the voice of the creative American, exemplified in '291,' '303,' and an American Place; Randolph Bourne, Waldo Frank, and Van Wyck Brooks, for launching a creative analysis of American culture; Frederic Howe, for his school of opinion—a pioneer attempt to build a true cultural group."

The author states his problem as "Social Reconstruction through Educational Reconstruction;" he devotes a little more than half the treatise to analyzing and assembling the characteristic concepts of American life, and then sets up his "tentative theory of living and program of educational reconstruction."

Under the concepts of American life are presented a most comprehensive survey of the opinions, motifs, and philosophies of the economists, scientists, psychologists, literary authors, philosophers, and artists, all thinkers who have created America's present culture status.

In the wide range of intellectual forces that illustrate "how beliefs are fixed and how the meanings of concepts grow" in developing American social order, the author gives a critical discussion of the role of pragmatism and instrumentalism evolved by Charles Santiago, Sanders Pierce, William James, and John Dewey. Great prominence is given C. S. S. Pierce as the frontier thinker in developing the methods of science underlying pragmatism.

"Through Pierce the pragmatic mind of America became articulate. William James became the great rationalizer, reflector and interpreter of the new industrial culture: America's best documenter of physiological and psychological archives."

Pragmatism in the hands of John Dewey became the instrumental method of thought: "The instrumentalist is concerned with the adjustment of the individual to the impact of successive experiences upon him and the adjustment of other individuals to him. Thus, putting the reins of conduct in the hands of ideas, he emphasizes the intellectual control of experience."

Frequent quotations are made from the chief works of Dewey, particularly *The Quest of Certainty, Human Nature and Conduct, and Democracy and Education* to illustrate how he (Dewey) "smashed at the view that isolated mind from activity, the traditional notion that action is inherently inferior to knowledge."

He bridges the gap between the pragmatic man, man thinking, of Pierce, James, and Dewey, to the artistic, dramatic, creative, emotionalistic man of Sullivan, Copeau, Max Reinhardt, Stanislavasky through essays and poetry of Emerson, Carlyle, and Whitman.

Having established the full psychological man, the author proceeds to social adaptation and the type of education essential for an American culture, the "school centered community and the child centered school."

The author exhibits an intimacy of acquaintance with the world's scholars in every field of intellectual endeavor. He refers to works of 412* authors, playwrights, philosophers, musicians, artists, poets, essayists, and makes 1189 references to the contributions these have made to the present status of American culture. He refers to Dewey 95 times; Emerson,

*These and the following figures are made upon a single count.

60; Pierce, 56; James, 52; Whitman, 51; Louis Sullivan, 50; Waldo Frank, 30; Randolph Bourne, 20; Copeau, 17; Stuglitz, 17.

The book is written in what might be called a minor key, stirring and stimulating. It is quite free from pedantry, possibly some economic problems are rather dogmatically settled and the minor poets of America rather summarily ranked, but all but universally the author is true to the science method of treatment. He frequently raises problems to clear doubts and hypotheses. A most interesting instance is the list of questions raised in doubt of pragmatic criteria for a full life.

His program for educational reconstruction involves as complete orientation of mind in educational formulae, nomenclature, and technique as the Einstein theory in physics.

H. C. MINNICH
Miami University

ACKERSON, LUTON. *Children's Behavior Problems.* Chicago: University of Chicago Press, 1931. xxi + 268 pp.

The subtitle of this volume, which describes the general nature of the research as well as any statement which the reviewer might write, reads as follows: "A Statistical Study Based upon 5000 Children Examined Consecutively at the Illinois Institute for Juvenile Research." The title page further suggests that the present volume is the first of a series.

Before attempting comment on the investigation proper, a few words of general orientation will help to give the setting of the study. The Illinois Institute for Juvenile Research has collected case records on more than 13,000 children to date. Although its primary purpose is individual diagnosis and treatment of behavior difficulties, it has steadfastly held to the point of view that research must always move hand-in-hand with the former aim. This first volume of a series represents a statistical exploration of 5,000 of these case records. The gathering of the data summarized has been the work of more than a hundred persons now or formerly associated with the Institute.

With these statements before us it is not too much to say that Dr. Ackerson has prepared a volume that time will call a classic in its field. The physician, the sociologist, the social worker, the psychologist, and the educator will find a mass of representative data here, not to be equalled in any other single reference.

From a technological point of view we find a rare combination and fusion of the best in the case study and statistical method, two investigational procedures often held to be antithetic by partisans of the one or the other. Equally rare in present-day investigations is a faultless statistical handling of materials. The author presents his findings principally by means of 55 tables and 57 figures. Discussions of the tables are succinct, avoiding the verbosity of most educational writers and the wild theorizing of many medical writers.

Space will not permit reference to more than scattered findings; present choices being governed by the bias of the reviewer as an educational psychologist. These are:

(1) The average number of behavior problems per child increases with age up to about 12 years, followed then by a decrease until age 17 when there is a marked rise. These trends are more characteristic of children whose IQ's are above 80 than of the subnormal.

(2) There is a little prospect of betterment of the behavior status of the child of 80 IQ or less with time, at least up to age 18.

(3) The correlations obtained for individual behavior traits indicate that many factors other than age and intelligence are potent in causing undesirable behavior.

(4) Traits whose frequency of incidence *decrease* with age are more likely to be "outgrown" with age than are those of "level" or increasing frequency of incidence with age.

(5) Boys show a greater average number of personality and of conduct problems than do girls; homosexuality being somewhat the more characteristic of boys and heterosexuality of girls. Comparisons of whites and Negroes are more uncertain because of possible selective factors.

(6) Among the irregularities showing marked increase with age are: depressed spells, daydreaming, laziness, inferiority complexes, and certain sex misdemeanors.

(7) The following traits show roughly constant incidence at all ages considered: egocentric attitudes, selfishness, irritability, violent tempers, sneakiness, queerness, emotional instability, and boastfulness and showing-off.

The foregoing summaries are obviously incomplete and superficial. For this no apology is offered since Ackerson's book is of such a detailed and painstaking character that no review can hope to be adequate.

G. M. RUCH

University of California

CLAPARÈDE, DR. ED. *L'Éducation Fonctionnellee* (Functional Education). Neuchatel (Suisse): Delachaux and Niestle S. A., 1931.

The book consists for the most part of articles that have previously appeared in various publications not readily accessible or are now out of print. It contains the following papers: (1) an introduction tracing the development of the functional idea in education; (2) a discussion of Rousseau's notion of the functional concept; (3) the psychology of intelligence; (4) the function of the will; (5) *Discat a puero magister;* (6) the psychology of the activity school; (7) a functional method of teaching language; (8) education and democracy; (9) why do they yawn?; (10) the report of the Paris Congress of Mental Hygiene on the functional concept of education (June, 1922); and (11) conclusions.

The expression, "functional education," is used to designate that education which proposes to develop the mental processes by considering them, not by themselves, but in their biological sense, in their role, and in their utility for present and future action, for life. The author sets forth ten laws of conduct: (1) *the law of need* (*Besoin*): Every need tends to provoke the appropriate reactions for its satisfaction. A need is defined as a broken equilibrium of a biological organism. (2) *the law of the extension of mental life* (*l'Extension de la Vie mentale*): The development of mental life is proportional to the discrepancies existing between needs and the means of satisfying them. If the means of satisfying the need is immediately available, as is the air, there is no mental activity; when the need is great and the means of satisfying it not immediately at hand, mental activity is provoked. (3) *the law of the fixation of consciousness* (*Prise de Conscience*): The individual becomes conscious of a process, of a relationship, or of an object all the later because his conduct has involved earlier and for a long time automatic usage, unconscious of this process, of this relationship, or of this object. (4) *the law of anticipation* (*Anticipation*): All needs which, by their nature, cannot be immediately satisfied, appears in advance, as, for example, hunger. (5) *the law of in-*

terest (*l'Intérêt*): All conduct is dictated by an interest. That is to say, all action consists of attaining the end which we consider important for the moment. Needs project themselves into the exterior world as objects to be attained. The word "interest" is used to express the relation between a subject and an object, that is, the object in its relation with a need. (6) *the law of momentary interest* (*l'Intérêt momentané*): At any instant an organism acts along the line of its greatest interest. (7) *the law of the reproduction of similars* (*Reproduction due semblable*): All needs tend to reproduce the reactions (or situations) which have been previously favorable to them, to repeat the conduct which has previously succeeded in a similar circumstance. (8) *the law of trial and error* (*Tâtonnement*): When the situation is so new that it evokes no association of similarity, or when the repetition of similars is ineffective, the need releases a series of searching, groping, or trial and error reactions. (9) *the law of compensation* (*Compensation*): When a broken equilibrium cannot be re-established by an adequate reaction, it is compensated for by an antagonistic reaction of the deviation which it excites. (10) *the law of functional autonomy* (*Autonomie fonctionnelle*): At every moment of its development an animal constitutes a functional unit, that is, its capacities for reaction are adjusted to its needs.

Following out the notion of reducing broad generalization to laws, the author summarizes Rousseau's contribution to education under five laws relating to the functional concept of infancy: (1) *the law of genetic succession* (*Succession génétique*): The infant in its natural development passes through a certain number of stages which succeed one another in a constant order. The steps are the same as those transcoursed by mankind. Education ought to conform to the march of mental evolution. (2) *the law of genetic exercise* (*Exercise génético-fonctionnel*): (a) The exercise of a function is the condition necessary to its development; (b) the exercise of a function is the condition necessary to the opening out of certain other ulterior functions. (3) *the law of functional adaptation* (*Adaptation fonctionnelle*): Action is aroused when it becomes the means of satisfying a need or interest of the moment. And the following corollary: In order to activate an individual, it is necessary to place him in the conditions appropriate to the birth of the need that will arouse the desired reaction. (4) *the law of functional autonomy* (*Autonomie fonctionnelle*): The child is not, considered by himself, an imperfect being; he is a being adapted to the circumstances which are appropriate to him; his mental activity is appropriate to his needs, and his mental life constitutes a unity. (5) *the law of individuality* (*Individualité*): All individuals differ more or less in respect to physical and psychological characteristics from others.

In his discussion of the psychology of the activity school, the author deplores the lack of understanding of the word "activity." He makes the point that when a lesson brings forth a *response*, and the pupils are not passive, it fulfills the office of the activity school. It is because of this confusion in the meaning of the term "active" that the author has preferred the term "functional education," which is founded upon a need. The need and the interest resulting from this need are factors which make one's reactions true acts. An act which does not directly or indirectly rest upon a need is a thing contrary to nature; and such are many of the activities of the traditional school. In reply to the criticism that the school is outside of the life

of the child and must be, that there is an insurmountable wall between the school and life, he suggests the study of child psychology from which one will find that the child is a being one of whose principal needs is play. And play is recognized as of capital importance to the activity school. Knowledge is merely a means to an end, and not an end in itself. One can find good counsel in pedagogical books on motivation, but the discussions are not particularly profound. The author recommends a study of the child to discover his natural interest.

The author's conception of functional education is illustrated in a chapter of teaching language in which he decries the usual method of teaching language through grammar. The conventional method of teaching language makes language an end in itself rather than a means to an end. Language instruction should proceed from the desire to express one's self or to communicate a thought, or idea, rather than from the study of classified categories.

In discussing education and democracy the author makes a point of the fact that the present regime is based upon authority and not democracy: the pupils on one side, and the teacher on the other. The social sense is not developed by a number of individuals merely sharing the same classroom, but by a series of actions and reactions among these individuals; it implies communication, coöperation, collaboration, and mutual interest. Democracy is not a static something to be mastered once for all, but something to be achieved by common effort. The best preparation for life is life. If education proposes to prepare for life without being life itself, it is no preparation for life.

The volume constitutes a substantial contribution to an important aspect of education by a noted continental scholar (Dr. Claparède is professor at the University of Geneva and editor of the *Archives de Psychologie.*). The author attempts to bring order to a much confused field of study by basing its concepts upon the facts of biology and psychology. It offers to the American reader a valuable supplement to the already excellent statements by Dewey, Thorndike, and Kilpatrick.

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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

GORDON, HANS COCHRANE. *The Specific Nature of Achievement and the Predictive Value of the I.Q.*—An Investigation of the Limitations Placed Upon the Predictive Values of Otis I.Q.'s by the Variation in the Achievements of Twelfth Grade Students in Their Different Subjects. Doctor's Thesis in Education, University of Pennsylvania, 1931. 147 pp.

Contains a statement of the problem, a summary of previous investigations, a description of the data, the measures used, and correlation facts concerning the I.Q. and subject achievement. Bibliography.

KAWIN, ETHEL, HOEFER, CAROLYN, AND OTHERS. *A Comparative Study of a Nursery-School Versus a Non-Nursery-School Group:* Based upon Studies made by the Elizabeth McCormick Memorial Fund and the Institute for Juvenile Research Assisted by the Behavior Research Fund. Chicago, Illinois: University of Chicago Press, 1931. 52 pp.

A comparative study of the social, mental, and physical growth of nursery and non-nursery school groups.

National Education Association. "Teacher Demand and Supply," *Research Bulletin of the National Education Association,* IX (November, 1931), 307-405.

Contains an introduction and a discussion of teacher demand and supply: problems, previous studies, etc. Bibliography.

"Report on Sangren-Woody Reading Test," *Pittsburgh Schools* (Board of Public Education), VI (September-October, 1931), 67 pp.

A statistical report of the results secured from an application of the Sangren-Woody Reading Test in the elementary grades (four to eight) of the Pittsburgh Public Schools.

TAYLOR, J. CAREY. "The Reliability of Quarterly Marks in the Seventh Grade of Junior High School, Together With the Value of Certain Standard Tests in Predicting Them," *Johns Hopkins University Studies in Education,* Nov. 17, 1931. 54 pp.

Contains a statement of the problem; a discussion of the value of the Otis Group Test and the Stanford Achievement Tests in reading and arithmetic in predicting scholarship in the first year of the junior high school; the reliability of teachers' marks in predicting success; etc.

University of Kansas Bulletin of Education, III (October, 1931), 21 pp.

Contains summaries of the following studies: "Certain Interests of Seventh Grade Junior High School Pupils of Kansas City, Missouri," by Walter R. Smith

and William Englund; "Objectives of History Teaching in High Schools of Kansas," by F. P. O'Brien and G. E. Watkins; "Some Sources of Subject Matter for Biology in High School," by E. E. Bayles and Anna M. McCullough; "An Analytical Study of Thirty-One Disability Cases in Reading," by B. A. Nash and Myrtle Keplinger; "The United States Has Too Many Small Rural High Schools," by Courtesy of U. S. Office of Education; "School Children Safer Than Adults With Reference to Motor Vehicle Fatalities," by Courtesy of National Safety Council; and "The Inglis Lectures," an editorial.

WAHLQUIST, JOHN T. "Status of the Junior College Instructor," *United States Department of the Interior Pamphlet* No. 20 (September, 1931), 29 pp.

Contains a statement of the problem, the social status, the economic status, the professional status, and the legal status of the junior college instructor.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

ENGLE, T. L. "A Comparative Study of Pupils in Academic, Commercial, and Vocational Curriculums," *School Review*, XXXIX (November, 1931), 665-672.

A comparative study of the achievement of second semester ninth grade and tenth grade pupils in academic, commercial, and vocational curriculums in the Michigan City High School. The study indicates that, when mental ability is kept constant, there is justification for the opinion that standards of work are highest in academic courses and lowest in vocational courses.

MERIAM, J. L. "Graduate Courses in Education," *Educational Administration and Supervision*, XVII (November, 1931), 574-582.

A statistical analysis of graduate courses in education in state universities.

PALMER, CHARLES W. "A Study of Part-Time Jobs for Boys," *School Review*, XXXIX (November, 1931), 673-682.

A questionnaire study to determine the earnings of boys in the Northeast High School, Philadelphia, for the years 1925, 1927, 1928, and 1930. It was shown that the earnings of 23.3 percent of the boys at Northeast High School who were working at part-time jobs in 1929-30 totaled more than $121,000. These earnings were used by 70 percent of the boys to help with the family budget. In 42 percent of the cases the work enabled the boys to stay in school. The school performance of the workers was superior to the average of the school.

PUNKE, HAROLD H. "The Folk High School and Other Recently Developed Institutions in German Adult Education," *School Review*, XXXIX (November, 1931), 696-706.

A statistical study of the distribution of adult students in the German Folk high school.

VAN DYKE, GEORGE E. "Trends in the Development of the High-School Offering. I," *School Review*, XXXIX (November, 1931), 657-664.

A study of the curriculums for three periods, namely, 1906-11, 1915-18, and 1929-30. The trend in the organization of courses of study in high schools is not toward standardization.

WEEKS, I. D. "Difficulties of Rural Teachers," *Educational Administration and Supervision*, XVII (November, 1931), 619-623.

A report of a check-list on the difficulties of rural teachers filled out by 86 teachers.

EXPERIMENTAL STUDIES OF TEACHING AND LEARNING

ADAMS, DONALD K. "A Restatement of the Problem of Learning," *British Journal of Psychology* (General Section), XXII (Part 2), (October, 1931), 150-178.

A critical discussion of the simpler types of the learning of animals in puzzle boxes, mazes, etc. After discussing parsimony of movement, sensitivity, and retentivity, the author concludes that all learning is a reorganization of a field determined by an obstructed need. Repetition has only a contingent relation to learning.

ALDRICH, CECELIA G., AND DOLL, EDGAR A. "Problem-Solving Among Idiots: The Use of Implements," *Journal of Social Psychology*, II (August, 1931), 306-335.

This is one of a series of experimental studies from the Vineland Laboratory designed to investigate certain theories of the nature of feeblemindedness.

BROWN, ANDREW W., AND LIND, CHRISTINE. "School Achievement in Relation to Mental Age—A Comparative Study," *Journal of Educational Psychology*, XXII (November, 1931), 561-576.

The author shows that students in the lowest I.Q. group are making achievement scores from 6 to 30 months below their mental age, while children of the same level of intelligence in the average group are making achievement scores from 2 to 16 months above their mental age. From this it would appear that the relation of achievement to mental age depends not so much upon the level of intelligence but upon the position of that level in the group receiving instruction.

DICKEY, JOHN W. "Much Ado about Zero," *Elementary School Journal*, XXXII (November, 1931), 214-222.

The author asserts that arithmetical computations involving zero are the great trouble-makers of the elementary school and that teachers and pupils alike reveal a lack of confidence in arithmetical operations involving zero. He presents certain inductive procedures for teaching the product values of zero times any number, and the dividend values of zero divided by any number, or vice versa.

DIETZE, ALFRED G., AND JONES, GEORGE ELLIS. "Factual Memory of Secondary School Pupils for a Short Article Which They Read a Single Time," *Journal of Educational Psychology*, XXII (November, 1931), 586-598.

The authors present data on the range and average extent of the immediate and delayed factual memory of pupils in grades seven to twelve.

MACE, C. A. "The Influence of Indirect Incentives Upon the Accuracy of Skilled Movements," *British Journal of Psychology* (General Section), XXII (Part 2), (October, 1931), 101-114.

In a target practicing experiment the author shows that a decrease in the size of the target is accompanied by an increase in accuracy, and shows the relations of these facts to various problems in psychology, including the matter of incentives.

MEADOR, MILDRED. "Are Pictures an Effective Aid in the Teaching of Geography?" *Educational Method*, XI (November, 1931), 97-103.

This is an experimental study from which the author concludes that pictures are effective in the teaching of geography in the elementary grades.

NEWELL, NANCY. "For Non-Readers in Distress," *Elementary School Journal*, XXXII (November, 1931), 183-195.

A psychological analysis of the reading process.

ROBSON, G. M. "Social Factors in Mental Retardation," *British Journal of Psychology* (General Section), XXII (Part 2), (October, 1931), 118-135.

An experimental study from which the author concludes that the difficulties of backward children are based upon a social defect: the relative inability to interpret other people's behavior and consequently to share in their experience.

SKAGGS, ERNEST B. "A Study of 'Warming-Up' in the Case of a Task of More Complicated Perceptual-Motor Coördination," *Journal of Applied Psychology*, XV (October, 1931), 499-511.

An experimental study from which the author finds warming-up effects in about 40 percent of the cases.

TINKER, MILES A., AND PATERSON, DONALD G. "Studies of Typographical Factors Influencing Speed of Reading, VII. Variations in Color of Print and Background," *Journal of Applied Psychology*, XV (October, 1931), 471-479.

Ten color combinations in addition to black on white were compared with respect to their effect on reading rate. Striking differences in rate of reading text material printed with various combinations of colored ink and paper were disclosed. The best combinations were black on white, grass green on white, lustre blue on white, and black on yellow.

WRIGHT, MELVIN B. "The Development of Mental Ability at the College-Adult Level," *Journal of Educational Psychology*, XXII (November, 1931), 610-628.

The author distinguishes between fundamental abilities and complex mental processes, indicating that the complex mental processes are more largely due to environmental pressures than are fundamental abilities, and thus they respond and increase more rapidly at the college-adult level than the latter.

YOUNG, PAUL THOMAS. "Sex Differences in Handwriting," *Journal of Applied Psychology*, XV (October, 1931), 486-498.

An experimental study from which the author concludes that there are two types of handwriting, masculine and feminine, and that untrained judges are able to determine the sex of the writer from handwriting with an average performance 11 percent better than chance.

EDUCATIONAL CURRICULUM AND OBJECTIVES

HARRING, SYDNEY. "What Primer Shall I Use Next?" *Elementary School Journal*, XXXII (November, 1931), 207-213.

A statistical analysis of 15 primers indicating the percentage of words common to each primer and every other primer. This information should be of value in selecting supplementary reading.

MACLATCHY, JOSEPHINE H. "A Phase of First-Grade Readiness," *Educational Research Bulletin*, Ohio State

University, X (October 14, 1931), 377-380.

An analysis of the amount of arithmetical knowledge possessed by pupils entering the first grade of the Cincinnati Public Schools. The report indicates that a considerable amount of arithmetical information is acquired prior to formal training in this subject.

MEASUREMENTS AND STATISTICS

STRANG, RUTH. "Knowledge of Social Usage in Junior and Senior High Schools," *School and Society*, XXXIV (November 21, 1931), 709-712.

A test of good manners and courtesy containing 110 items was given to 1,614 junior and senior high-school pupils. The mean score increased from the seventh to the twelfth grade. The correlations between knowledge of social usage and I.Q. were .44 for the seventh grade, .51 for the eighth grade, and .33 for the ninth grade. A higher mean score was obtained by pupils whose fathers came from the professional group.

EDUCATIONAL RESULTS AND ACHIEVEMENTS

CATTELL, PSYCHE. "Why Otis' 'I.Q.' Cannot Be Equivalent to the Stanford-Binet I.Q." *Journal of Educational Psychology*, XXII (November, 1931), 599-603.

The author shows that the Otis I.Q. differs from the Stanford-Binet I.Q. by an appreciable amount.

CONSTANCE, CLIFFORD L. "Personality Ratings Given High-School Graduates by Principals and Teachers," *School Review*, XXXIX (November, 1931), 683-688.

A study of the reliability of personality ratings by high school principals and teachers. The author shows that, while the conventional rating of the principal is highly unreliable, a composite rating from a number of teachers is satisfactory.

LINDQUIST, A. E. "The Form of the American History Examination of the Coöperative Test Service," *Educational Record*, XII (October, 1931), 459-475.

The author presents a description of the five major divisions of the American History examinations to be prepared for the Coöperative Test Service of the American Council on Education.

PERRY, WINONA M. "Prognosis of Abilities to Solve Exercises in Geometry," *Journal of Educational Psychology*, XXII (November, 1931), 604-609.

The author shows that the Perry Geometry Prognosis Test has predictive value.

SMITH, MAPHEUS. "Concerning the Magnitude of the Behavior Sample for the Study of Behavior Traits in Children," *Journal of Applied Psychology*, XV (October, 1931), 480-485.

From an examination of the observation records of children, the author proves that large samples show a higher reliability than small. In fifty minute groupings of carefully controlled, short, periodical observations the mean r is approximately .80. The theoretical length of a sample for a reliability of .95 ranges from 155 to 185 minutes.

VANCE, THOMAS F., AND GRANDPREY, MEDORA B. "Objective Methods of Ranking Nursery School Children on Certain Aspects of Musical Capacity," *Journal of Educational Psychology*, XXII (November, 1931), 577-585.

The authors describe objective methods of securing data on certain aspects of musical capacity indicating how the nursery school may be used as a teaching laboratory to secure data of both scientific and practical value.

WEAVER, ROBERT B., AND TRAXLER, ARTHUR E. "Essay Examinations and Objective Tests in United States History in the Junior High School," *School Review*, XXXIX (November, 1931), 689-695.

A study to determine the comparative value of essay examinations and objective tests in measuring historical understanding and comprehension. In general, this study suggests that when essay tests and objective tests are carefully made, and when the scoring of essay examinations is kept as objective as possible, the tests have about equal merit.

MISCELLANEOUS

SHANNON, J. R. "Contributors to Educational Periodicals," *Elementary School Journal*, XXXII (November, 1931), 177-182.

The author shows the number of contributions from university students, professors, secondary school principals, elementary school principals, and elementary school teachers to 21 educational periodicals.

NEW TESTS

BISHOP, FLORENCE, AND IRWIN, MANLEY E. *Instructional Tests in Plane Geometry.* Yonkers-on-Hudson, New York: World Book Company, 1931.

A series of thirty-six tests, each test covering a unit of subject matter. The tests are designed to provide at frequent intervals (about once a week) an analysis of class and individual needs, to be used as a basis for reteaching.

DRAGOO, A. W. *Dragoo Rating Scale for Shop Teachers.* Bloomington, Illinois: Public School Publishing Company, 1931.

This scale consists of 17 traits or characteristics which are believed to be measures of teaching efficiency of shop teachers.

GREENE, HARRY A., AND PIPER, ALVA H. *Iowa Algebra Aptitude Test.* State University of Iowa, Iowa City: Bureau of Educational Research and Service, 1931.

A new aptitude test designed for use in the field of first year algebra.

MAGRUDER, F. A., CLINTON, R. J., AND CHAMBERS, M. M. *Magruder-Chambers-Clinton American Civics and Government Test for High Schools and Colleges.* Bloomington, Illinois: Public School Publishing Company, 1931.

This test has been constructed with the view to giving teachers a valid and reliable measuring instrument in national, state, and local governments.

NEWLAND, T. ERNEST. *Newland Chart for Diagnosis of Illegibilities in Written Arabic Numerals.* Bloomington, Illinois: Public School Publishing Company, 1931.

A device for the determination and analysis of those features of any individual's writing of Arabic numerals which make them difficult to read.

PATTERSON, RAYMOND G. *Patterson Test or Study Exercises on the Constitution*

of the United States. Bloomington, Illinois: Public School Publishing Company, 1931.

A test-exercise of the selection type, suitable either for the study of the United States Constitution or for testing.

STEWART, A. W., AND ASHBAUGH, E. J. *Stewart-Ashbaugh Physics Tests.* Bloomington, Illinois: Public School Publishing Company, 1931.

These tests, Forms I and II, were designed primarily as tests to be given at the end of the semester. The first semester test covers mechanics and heat; the second, electricity, sound, and light.

WRIGHT, HARRY M. *Wright Achievement Test in Mechanical Drawing.* Bloomington, Illinois: Public School Publishing Company, 1931.

This test is to measure achievement in mechanical drawing; it may be used in high school or in beginning courses in college. There are nine parts: two on information, two on dimensioning, two on projection, and the rest on applied geometry, lettering, and ability to read a drawing.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

The 1932 Yearbook of the National Society for the Study of Education.—The National Society for the Study of Education has for Part II of its 1932 yearbook the results of the American Association of University Women study of current changes and experiments in 315 liberal arts colleges, made under the direction of Kathryn McHale, Director of the Association. It will be presented February 23, 1932, at Washington, D. C., at the joint meeting of the National Society for the Study of Education and the National Society of College Teachers of Education.

The topics to be discussed in the yearbook are:

1. Some Significant Experiments and Widely Instituted Changes Revealed by the A.A.U.W. Study, C. S. Boucher, Dean of the College, University of Chicago.
2. The 125 Outstanding Changes and Experiments, Frances Valiant Speek, Research Associate in Secondary and Collegiate Education of the American Association of University Women.
3. Major Phases of Experimental Change with Significant Ventures.
4. Special College Ventures in Provisions for the Promotion of the Intellectual Life, Kathryn McHale.
5. Criticisms of English and American College Practices, Agnes L. Rogers, Professor of Psychology and Head of Department of Education, Bryn Mawr College.
6. Some Descriptions and Criticisms of Educational Experimental Techniques in Colleges, Alexander Meiklejohn, Chairman of the Experimental College, University of Wisconsin.
7. Liberalizing a Liberal Education, Hamilton Holt, President, Rollins College.
8. A Prognosis for Changes and Experiments in Liberal Arts Education, Kathryn McHale.

When the study was initiated in January, 1930, invitations to coöperate were sent to every liberal arts college on the lists of the American Association of University Women and the Association of American Universities. The country was divided into nine geographical regions, and a committee formed for each region made up of the coöperating institutions' representatives with a chairman.

Under these chairmen, meetings have been held in most regions to compile and discuss the findings. The chairmen then sent the findings for these regions to the Director of the study at national headquarters. These were further compiled and considered by the Director, a research associate, and a national advisory committee of educators who have themselves been instrumental in bringing about changes in collegiate education.

Three hundred and fifteen liberal arts colleges in the nine geographical regions were willing participants; 168 have coöperated by sending complete materials such as reports, documents, evaluations of their experiments, and the like; ninety-six have shown even more coöperative and active interest by actual visitations, serving as hosts to committees, conferences, etc.; while forty-seven have given unusual coöperation and support to the

study even to the extent of material assistance.

A detailed list of the problems investigated was published in the October, 1930, number of this department.

1932 Yearbook on Educational Psychology.—The forthcoming yearbook of the National Society of College Teachers of Education deals with the contribution of educational psychology to teacher training. The topics discussed include problems of college entrance, curriculum, methods of teaching, measurement of progress, certification, and training of teachers of educational psychology. The members of the committee charged with preparation of the yearbook are: L. A. Pechstein (chairman), F. D. Brooks, A. I. Gates, Carter V. Good, F. B. Knight, M. A. May, Joseph Peterson, G. M. Ruch, H. A. Toops, W. C. Trow, and L. W. Webb. Those who have been invited to prepare the criticism of the yearbook are M. E. Haggerty, C. H. Judd, and W. H. Kilpatrick.

Yearbook on Supervision.—The fifth yearbook of the Department of Supervisors and Directors of Instruction will appear in February, 1932, with the title, *Supervision and the Creativeness of the Teacher.* The committee responsible for this yearbook has as its chairman Elma Neal, Assistant Superintendent of Schools, San Antonio, Texas. Among the major topics treated are: the concept of creativeness, the principles of supervision which aim at creativeness, practical procedures, and case studies and interpretations at the several levels of instruction—primary, intermediate, junior-high, senior-high, and rural school grades.

Chicago Principals' Yearbook.—The sixth yearbook (1931) of the Chicago Principals' Club deals with character education. It reviews the history and theories of character education, presents typical plans employed in the Chicago schools, and reports a series of attempts to evaluate certain procedures in character education in the Chicago schools. The editorial work was done by Gilbert H. Wilkinson, Vernon L. Bowyer, and Olice Winter. Earlier yearbooks have dealt with a variety of problems: failure, administration, supervision, reading, curriculum, educational tests and measurements, and health education.

Research in the Philippines.—The Measurement and Research Department of the Bureau of Education in the Philippines was established in 1924. The main staff at present consists of a chief (Manual L. Carreon), four supervisors, an assistant, and four clerks. This force is assisted by the insular pensionados (teachers continuing their studies under government scholarship) to the Philippine Normal School at Manila, in compiling data on the results of testing surveys and other studies.

The personnel of the department is stationed in the General Office of the Bureau of Education at Manila. The supervisory personnel visits all the schools in the entire school system, so that testing surveys are possible, and other educational problems readily may be investigated by the department. The findings resulting from the research activities of the department are easily integrated into the school system by reason of the supervisory power given to traveling members of the staff.

The department has measurement of instruction as one of its major objectives. It conducts alternate yearly surveys of central-academic-normal schools and rural-vocational schools, with the Philippine Educational Achievement

Tests both Advanced and Primary Examinations: Series A, Arithmetic; Series B, Reading; Series C, Language, Dictation, and Composition; and Series H, General Science. It also gives annual tests in secondary subjects, and occasionally in other subjects such as health education, music, food selection and diet, sewing and textiles, food, and health.

In addition to the achievement tests, the department develops mental ability tests. It now has the Philippine Mental Ability Tests, Advanced and Primary Examinations, which are used chiefly for entrance examinations and for classification purposes.

Another major activity of the department is that of conducting research. Members of the department carry on individual or joint studies. They also help teachers, principals, supervisors, and superintendents in conducting field research projects.

The results of the surveys and of some other studies are published in the monthly magazine of the Bureau of Education, *Philippine Public Schools*, in the annual reports of the Director of Education to the Secretary of Public Instruction, and in memorandum forms sent to field workers.

Research in Australia—The first annual report of the Australian Council for Educational Research, 1930-1931, with headquarters at 145 Collins Street, Melbourne, Australia, is an interesting and significant document. The activities of the Council are supported by a subsidy from the Carnegie Corporation of New York extending over a ten-year period. Its objectives are to promote, subsidize, and publish research studies, as well as to select qualified workers for given investigations and to assist in the promotion of desirable educational experiments or developments.

The report includes lists of the studies and publications sponsored by the Council, which read much like the titles of current projects in this country, including individual instruction, testing, visual education, problem children, guidance, broadcasting, etc. In a number of schools the Dalton and platoon plans have been tried.

Oklahoma Division of Research and Service.—The Division of Research and Service was established in the State Department of Education, July 1, 1929. It was made possible through a grant of money by the General Education Board of New York City. The director is Marshall Gregory.

The work of the Division may be divided into three parts: (a) to collect and disseminate information concerning the schools of Oklahoma; (b) to make systematic studies of administrative problems pertaining to the schools of the state educational system; and (c) to coöperate with other members of the department and with other educational agencies in the study of school problems.

During the first year of service, the members of the Division attempted to become familiar with the work and duties of all other divisions of the Department and their relation to the schools and school children in the state. To further this end, numerous conferences were held with all members of the Department, and the reports and applications made to the state office during the past several years were studied. In the study of the records of this office inconsistencies and inaccuracies have been discovered. They point to the need for a comprehensive and detailed statistical history of the status of education during each year since statehood. The statistics for this summary are now being assembled.

During the first year, the Division attempted to take the preliminary steps toward the achievement of the three purposes stated above. One of the first requirements of a research program is a rather complete supply of facts. The first step, therefore, was to make a tentative selection of the information needed in the Department. Three requirements were kept in mind during this selection: (a) the necessity for the continuity of records in the office, (b) the necessity for data for comparative studies of education in this state and in other states, and (c) the desirability of having rather complete and detailed information on the most pressing administrative problems confronting the department or the schools of the state.

When the types of information to be gathered had been selected, it became necessary to revise the report blanks made to the State Department by the local school systems and higher institutions in the state. All of the material with which the Division of Research and Service works must come from the local districts and institutions. Five principles were kept in mind in the revision of all of the report forms:

1. They should be complete.
2. There should be no duplication of reports.
3. No information should be requested from the local districts unless the Department expects to summarize it and publish the summaries.
4. Every report blank should be accompanied by a manual of instructions, interpreting the various questions on the blank.
5. The report forms should be so constructed that the clerical work of filling it out will be at a minimum.

Four principal reports were revised during the year. They were: (1) the annual statistical reports for independent districts, (2) the county superintendent's annual report, (3) transportation reports for all districts furnishing transportation, and (4) the list of teachers employed in the Oklahoma schools.

The dissemination of information has been limited to four types. The first type is the preparation by the State Department of Education of mimeographed bulletins, containing statistical information concerning the status and progress of the public common schools of the state. Fifteen of these bulletins were issued during the first year. News stories and articles have been prepared for release to newspapers and magazines. Much information has been given out to the public through personal conferences.

Information blanks have been designed to provide the statistical facts from which two problems may be systematically studied. The Department is repeatedly called upon to answer questions concerning transportation, such as, "Who should own the busses?" or "Should pupil drivers be employed?" The Department should have on file statistical summaries which would enable it to answer these questions in terms of the actual present practice in the State. Also, there is a generally admitted need for a more or less complete study of the supply of and demand for teachers in Oklahoma.

The Division is attempting to build up in the State Department a library of source material received from other state departments. As time permits, bibliographies on current state problems are being collected or prepared. The Division has coöperated with the Schoolhouse Planning Division in two building surveys. In the first instance an analysis was made of the financial status of the city surveyed. In the second instance, a study of the present and probable future school population, a study of the cost of the proposed building program, and an

analysis of the ability and effort of the school district to make permanent improvements, in comparison with ten other comparable city districts, were made. The Division also has coöperated with graduate students in the supplying of data for their theses, and in interpreting to them certain research needs from the state's point of view.

Cincinnati Abstracts in Education.—Published volumes of abstracts of graduate theses are highly desirable for a number of reasons. The Master's thesis rarely is published as a whole. Many graduate institutions no longer require the publication of the Doctor's dissertation. Considerable delay and "red tape" are involved in borrowing typewritten theses from university libraries.

A volume of abstracts accomplishes several purposes. In universities where publication of the Doctor's abstract is required, it makes such summaries available under one cover and provides an avenue for wider distribution of the results reported. Dissemination of information concerning problem, technique, and conclusion acts as a stimulating influence in the improvement of student and faculty standards of research. Publication of such a volume makes at least a small contribution to educational literature.

Among the graduate institutions which have inaugurated publication of graduate abstracts in education is the Teachers College, University of Cincinnati, of which L. A. Pechstein is dean. The first number of the series covers the period, 1927-1931, inclusive, during which were awarded twenty-three Doctors' degrees and 121 Masters' degrees in education. The first volume, comprising 420 pages, includes summaries of sixteen Doctors' and thirty-three Masters' theses selected from this group, covering a wide range of problems and fields. A complete list of Cincinnati graduate theses in education completed from 1924 to 1931 and a list of theses now under way in education are included.

The first number of the series was published simultaneously with the opening of the new Teachers College building, September, 1931. It was compiled and edited by the faculty publication committee: Carter V. Good, Walter L. Collins and Chester A. Gregory.

Other abstracts series which recently have come to the attention of this department are those at Chicago, Colorado, Illinois, Pennsylvania State, Pittsburgh, and Southern California.

Duke University Research Series.—Duke University has launched a new series of educational monographs, entitled Duke University Research Series, and published by the press of the same institution. The first number, *The Effect of Unfamiliar Settings on Problem Solving*, was written by W. A. Brownell and Lorena Stretch of the Duke Department of Education.

This series is a welcome addition to the group of monograph series in education fostered by most of the major graduate institutions for the preparation of teachers. These monographs series are meeting the criticism that too frequently the results of graduate theses and other investigations are buried in local libraries or in the files of the institution, laboratory, or research agency.

University of Michigan Research.—The Bureau of Tests and Measurements was authorized in the budget of the Department of Education during the academic year of 1919-20. With the establishment of the School of Education, in 1921, the

name was changed to the Bureau of Educational Reference and Research. The purpose of the Bureau is to guide the research activities of various groups of school men within the state, to summarize and call attention to results of research activities within the state and elsewhere, and to initiate and carry on original investigations in the field of education. The director is Clifford Woody.

In the past the Bureau has issued intermittently mimeographed bulletins setting forth the results of research activities undertaken within the state at large. In the future it will continue the preparation of many mimeographed bulletins, but will print the results of the more important investigations.

Bulletin No. 140 gives the results of the testing programs which were carried on in the elementary and high schools of the State of Michigan during the second week of May, 1931. The program in the elementary school consisted of the New Stanford Achievement Test, the Detroit Word Recognition Test, and the Detroit Reading Test; the program in the high school consisted of the Kirby Grammar Test, the Van Wagenen Reading Scales in English Literature, the American Council Alpha French Test, the White Latin Test, the Columbia Research Bureau Algebra Test, the Columbia Research Bureau Plane Geometry Test, the Iowa Physics Test, the Powers General Chemistry Test, the Ruch-Cossmann Biology Test, the Ruch-Popenoe General Science Test, the Brown-Woody Civics Test, and the Gregory Test in American History.

Illinois Bureau of Research.—The past year has not been marked by any significant change in the activities of the Bureau of Educational Research at the University of Illinois. Because the director, Walter S. Monroe, was acting dean of the College of Education and consequently could not devote a great deal of time to the work of the Bureau, its activities were somewhat curtailed. Now that Dr. Monroe is no longer acting dean he is again giving the major part of his time to the Bureau.

The publications of the Bureau during the year were, as usual, devoted to several quite different phases of the field of education. The following bulletins appeared: "A Project in Fourth-Year English Composition—A Description of the University High School," "Proceedings of the Annual Conference of the Faculty of the College of Education, University of Illinois, with the Superintendents of the Schools of Illinois," "Annotated Bibliography of Graduate Theses in Education at the University of Illinois," "Teaching Devices on the High-School Level," "High-School Libraries in Illinois," "A Critical Summary of Research Relating to the Teaching of Arithmetic," and "Provisions for Mentally Atypical Pupils."

Apart from publications the most noteworthy work done by the Bureau consisted of visitation to public schools in the state. Although this visitation, which reached almost fifty systems, had as its chief purpose the collection of material for the last bulletin named above, yet it was not limited to this phase of school activity but included many others. This year it is planned to continue a similar program of visitation centered around unusual features and activities reported by superintendents and principals.

Minnesota Project.—A research project that involves the efforts not only of educators and psychologists but also of physicians, sociologists, labor leaders, employers, and business experts is being carried on at the present time at the University of Minnesota. This project is conducted under the Minnesota Employment Stabil-

ization Institute, of which R. A. Stevenson, dean of the school of business administration, is director. One important phase of the Institute's work is the case study and retraining recommendation of 4,000 jobless men and women, and the testing for physical and mental assets and liabilities, vocational interests, trade skill proficiency, and personality traits, of a control group of persons who are generally employed at satisfactory work. Descriptions and results of the work accomplished under the survey will be published at intervals during the next two years.

Recent Child Research at Iowa.—The past few years have witnessed a rapid increase in the accumulation and dissemination of scientific facts regarding child behavior. The research and graduate program of the Iowa Child Welfare Research Station permits any student who is the possessor of a Bachelor's degree from an accredited college to take work leading to a higher degree. A number of half-time research assistantships are offered to ambitious students who could not otherwise continue their studies.

The four research laboratories, one for each of the age groups (the two, the three, the four, and the five-year-old children), and the service of the station as the coördinating center for the work in child development and parent education of the three state educational institutions in Iowa were described in the April, 1930, number of this department.

During 1930-1931 the Station conducted research in the following divisions: (1) nutrition, (2) anthropometry and physical growth, (3) child psychology, (4) childhood education, and (5) parent education.

The program of the division of child study and parent education, as part of the Research Station and the extension division, includes activities on and off the campus of the university. In its work on the campus are the teaching of the course in this field during the academic year and the summer sessions, and extended service in advising parents with regard to reading material, maintaining child study libraries, and serving as the organization office for the work with child-study groups. The extension program consists of the leadership and direction of study groups. During 1930-1931 a total of 1,428 people were studying in seventy-four groups throughout the state.

The fifth annual State Conference on Child Development and Parent Education was held in Iowa City, June 16-18, 1931.

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